



BUREAU OF LAND MANAGEMENT

Southeastern States District Office 273 Market Street Flowood, Mississippi 39232

Environmental Assessment ES-020-2017-04

EOI #630, 726, 728, 730, 733, 737, 738, 739, 743, 961b, 1086, 1103, 1148, 1174, 1469, 1770, 1773 Cleburne, Stone, Van Buren, and White Counties, Arkansas Lease EA

October 16, 2017

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Appendix B: Agency and Tribal Correspondence

Appendix C: RFD Scenario for Arkansas EOIs

ACRONYMS AND ABBREVIATIONS

ADEQ Arkansas Department of Environmental Quality

AGFC Arkansas Game and Fish Commission
ANHC Arkansas Natural Heritage Commission
AOGC Arkansas Oil and Gas Commission
APD Application for Permit to Drill

APLIC Avian Power Line Interaction Committee

AQI Air Quality Index

AR Arkansas

ARESO Arkansas Ecological Services Office (USFWS)

BA Basal area

BCC Birds of Conservation Concern

BGEPA Bald and Golden Eagle Protection Act

BLM Bureau of Land Management
BMP Best Management Practices
CAIR Clean Air Interstate Rule

CDPHE Colorado Department of Public Health and Environment

CEQ Council on Environmental Quality

CERCLA Comprehensive Environmental Response Compensation and Liability Act

CFR Code of Federal Regulations

CH₄ Methane

CO Carbon Monoxide CO₂ Carbon Dioxide

CO_{2e} Carbon Dioxide equivalent COA Condition of Approval CSU Controlled Surface Use

°F Fahrenheit dB Decibel

dBA A-weighted decibel
DBH Diameter-at-Breast-Height
DOI (U.S.) Department of the Interior

E East

EA Environmental Assessment
EIS Environmental Impact Statement

ENSt Enders-Nella-Steprock soil series complex

EO Executive Order
EOI Expression of Interest
ES Executive Summary
ESA Endangered Species Act

ESt Enders-Steprock soil series complex Et al. Latin phrase et alia meaning "and others"

Et seq Latin phrase et sequentes meaning "and the following"

FLPMA Federal Land Policy and Management Act

FONSI Finding of No Significant Impact

FOOGLA Federal Onshore Oil and Gas Leasing Reform Act

GHG Greenhouse Gas

GIS Geographic Information System
GWP Global Warming Potential

H2SHydrogen SulfideHAPHazardous Air PollutantHFCHydrofluorocarbonHVHigh-Volume

IM Internal Memo

IPCC Intergovernmental Panel on Climate Change

KC Kenn-Ceda soil series complex

L Linker soil series

MBTA Migratory Bird Treaty Act
MLA Mineral Leasing Act

MOU Memorandum of Understanding

N North

NAAQS National Ambient Air Quality Standards

Nb Non-breeding

NBEM National Bald Eagle Management NEPA National Environmental Policy Act

NF National Forest

NHPA National Historic Preservation Act

N₂O Nitrous Oxide

NO_x Nitrogen Oxides (generic for air pollutants – NO and NO₂)

NO Nitrogen Oxide NO₂ Nitrogen Dioxide

NRHP National Register of Historic Places

NSO No Surface Occupancy NWR National Wildlife Refuge

O₃ Ozone OK Oklahoma Pb Lead

PFC Perfluorocarbon
PL Public Law
PM_{2.5} Particulate Matter

PM₁₀ Particulate Matter PPM Parts per Million

PSD Prevention of Significant Determination RCRA Resource Conservation Recovery Act RFD Reasonably Foreseeable Development

ROW Right of Way S South SEC Section

SF Sulfur Hexafluoride

SHPO State Historic Preservation Office SIP State Implementation Plan SMZ Streamside Management Zone

SO₂ Sulfur Dioxide

SOP Standard Operating Procedure

SPCC Spill Prevention Control and Countermeasure STAR (EPA's) Science to Achieve Results program

Std Standard

StL Steprock-Linker soil series complex

StMtn Steprock-Mountainburg soil series complex

StMtnR Steprock-Moutainburg-Rock outcrop soil series complex StNMtn Steprock-Nella –Mountainburg soil series complex

Tg Metric Ton

TCP Traditional Cultural Property T.R.S. Township, Range, Section

US United States

USACE United States Army Corp of Engineers

USC United States Code

United States Department of Agriculture USDA United States Department of Interior United States Environmental Protection Agency USDI

USEPA

United States Fish and Wildlife Service **USFWS**

United States Geological Survey USGS

Virginia VA

Volatile Organic Compound VOC

West W

Wilderness Area WA

WMA Wildlife Management Area

Washington Office WO

EXECUTIVE SUMMARY

Proposed Action. The Proposed Action is to lease 2766.06 acres of federal minerals located in Cleburne, Stone, and Van Buren Counties, Arkansas for potential future oil and gas development. The lease parcels evaluated as part of the Proposed Action consists of federal mineral estate underlying private surface and are assigned seventeen (17) Expression of Interest (EOI) #s: 630, 726, 728, 730, 733, 737, 738, 739, 743, 961b, 1086, 1103, 1148, 1174, 1469, 1770, and 1773 (Table ES-1). The proposed lease would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities at this stage. Although there would be no surface disturbance from the action of leasing, this Environmental Assessment (EA) analyzes a reasonably foreseeable development (RFD) scenario to address the anticipated environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this time. Before a lease owner or operator conducts any surface disturbing activities related to the development of this lease to access the federal minerals, the Bureau of Land Management (BLM) must first approve an application for permit to drill (APD) as specified in Title 43 Code of Federal Regulations (CFR) 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM would also conduct additional site-specific analysis in compliance with the National Environmental Policy Act (NEPA) and the appropriate consultations prior to approving the APD. The RFD scenario projects approximately 240.14 acres of surface disturbance from potential future oil and gas development associated with the proposed leasing action.

Purpose and Need. The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy while minimizing adverse effects to natural and cultural resources. The BLM minimizes adverse effects to resources by identifying appropriate lease stipulations and notices, best management practices, and mitigations. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended (30 United States Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which reduces the dependence of the United States on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

The leasing of federal minerals is vital to the United States oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to the list of EOIs in Table ES-1, consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

Table ES-1. Seventeen (17) Arkansas EOIs for EA-20-2017-04

State	File #	County	Legal Description	Acres
AR	EOI 630	Van Buren	AR, Van Buren County, Fifth Principal Meridian, T10N, R14W, Sec.34, NE SW; E2 SE SW; SW SE; Part of the NW SE described NWSE, southwest corner runs north 190 yards, east 190 yards, south 190 yards, west 190 yards to point of beginning 7.5 acres more or less and total 107.5 acres (190 yards = 570 feet)	107.5
	EOI 726	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T12N, R8W, Sec. 35, NWNW, Sec. 2, Fractional NW, Sec. 8, NENE, NWSE, Sec. 9, E1/2NE, NESE, Sec. 10, NWSW, Sec. 15, NWNW, Sec. 17, NWNW, NENW, SENW	453.2
	EOI 728	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T12N, R10W, Sec. 9, N2NW SESW, N2N2 SWSW, NWSW, Sec. 15, NWSW, SESW, SWSE	325
	EOI 730	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T12N, R12W, Sec. 23, NESE	40
	EOI 733	Van Buren	AR, Van Buren County, Fifth Principal Meridian, T9N, R12W, Sec. 21, Metes and Bounds (See map for description)	65
	EOI 737	Van Buren	AR, Van Buren County, Fifth Principal Meridian, T11N, R12W, Sec. 33, Part of the SWNW	10.63
	EOI 738	Van Buren	AR, Van Buren County, Fifth Principal Meridian, T11N, R14W, Sec. 1, SWNW, Sec. 2, NENW, Sec. 4, W2SE, Sec. 6, S2N2, NWNE, N2NW, W2SW, Sec. 18, W2NW, NESW, Sec. 31, E2NW, SWNE	765.33
	EOI 739	Van Buren	AR, Van Buren County, Fifth Principal Meridian, T11N, R15W, Sec. 13, NENE, Sec. 20, SENW, S2SWNW, S2NWSWNW, NWNWSWNW, Sec. 23, SWSE, Sec. 24, NWNE, Sec. 26, S2NW, Sec. 29, SESW, S2SE	507.5
	EOI 743	Van Buren	AR, Van Buren County, Fifth Principal Meridian, T12N, R15W, Sec. 15, W2NE, Sec. 26, NWNW	120
	EOI 961b	White	AR, White County, Fifth Principal Meridian, T9N, R7W, Sec. 26, W2SE	11.9
	EOI 1086	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T9N, R11W, Sec. 6, N2NE	80

EOI 1103	Stone	AR, Stone County, Fifth Principal Meridian, T13N, R12W, Sec. 36, S2SE	80
EOI 1148	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T12N, R11W, Sec. 36, SESE	40
EOI 1174	Van Buren	AR, Van Buren County, Fifth Principal Meridian, T12N, R14W, Sec. 20, W2E2E2SE	20
EOI 1469	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T21N, R11W, Sec. 24, SWSW	40
EOI 1770	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T12N, R11W, Sec. 4, SESW, and Sec. 23, SESE	80
EOI 1773	Cleburne	AR, Cleburne County, Fifth Principal Meridian, T11N, R12W, Sec. 1, W2NWNE	20

Environmental Impacts. The anticipated environmental impacts of the Proposed Action and No Action Alternative are summarized in Table ES-2.

Table ES-2: Summary of anticipated environmental effects.

Resource	No Action Alternative	Proposed Action
Land Use	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Minor, short and long term changes to land use from reasonably foreseeable development activities due to conversion of undeveloped areas to areas that support potential future oil and gas development.
Noise/Visual Resources	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Minor, short and long term adverse noise and visual impacts possible from reasonably foreseeable development associated with the lease parcel. Noise levels would lessen during the production phase.
Socioeconomics and Environmental Justice	Loss, reduction, or delay of revenues generated through leasing and royalties.	Leasing would generate revenues that would be shared with counties. Reasonably foreseeable development may generate additional royalties, economic stimulation in the form of additional employment, output, and support services. Environmental justice concerns are not expected.
Cultural Resources and Native American Interests	Would result in the continuation of the current land and resource uses. Potential impacts from "relic hunting", bulldozing, etc.	No direct impacts from leasing. Future surveys or consultation under the National Historic Preservation Act (NHPA) may be required at the APD stage.
Mineral Resources	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Use and depletion of the resource would occur from reasonably foreseeable development.
Wastes	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Wastes would be generated from reasonably foreseeable development, with a potential for short and long term adverse impacts if wastes are not properly handled, stored, and disposed. Standard operating procedures (SOPs), best management practices (BMPs), and conditions of approval (COAs) at the APD stage would minimize risk from spills.
Air Quality	No impacts. Would result	No direct impacts from leasing. Short and long term impacts due to

Resource	No Action Alternative	Proposed Action
	in the continuation of the current land and resource uses.	emissions from construction equipment and fugitive dust from reasonably foreseeable development.
Climate and Climate Change	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. The proposed lease may contribute to the installation and production of new wells, which may consequently lead to an increase in greenhouse gas (GHG) emissions.
Soils	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Potential for minor adverse impacts to soils from future reasonably foreseeable development associated with clearing, filling, and grading activities.
Water Resources – Surface and Groundwater, Floodplains, Riparian Areas, and Wetlands	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Potential for minor adverse impacts to water resources located on the parcel from future reasonably foreseeable development. SOPs, BMPs, and COAs at the APD stage would minimize risk to groundwater and surface water from spills.
Natural Resources (Wildlife and Vegetation, Invasives/Exotics, Special Status Species, Migratory Birds)	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing since there would be no surface disturbing activities. Potential for minor adverse impacts to wildlife and vegetation associated with reasonably foreseeable development associated with clearing for wellpad and road construction due to habitat loss and modification. No adverse impacts to threatened or endangered species, or habitat suitable for these species, are anticipated. Other wildlife species, including migratory birds, would experience loss of habitat and potentially direct disturbance impacts from reasonably foreseeable future development. These impacts are not expected to cause population level impacts to any species, including migratory birds.
Public Health and Safety	No impacts. No action would result in the continuation of existing	No direct impacts from leasing since there would be no surface disturbing activities. Potential future mineral development could result in exposure to contamination that may result in health conditions in sensitive or

Resource	No Action Alternative	Proposed Action
	public health and safety	susceptible populations. However, federal, state, and local regulations, as
	conditions.	well as health standards and protocols ensure that potential operations do
		not compromise public health and safety.
	No impacts. Would result	Negligible to minimal cumulative impacts are anticipated.
Cumulative Impacts	in the continuation of the	
Cumulative impacts	current land and resource	
	uses.	

1.0 CHAPTER 1 – PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The Bureau of Land Management (BLM) has prepared this Environmental Assessment (EA) to evaluate the anticipated environmental impacts of leasing 2766.06 acres of federal mineral estate to support potential future oil and gas development in Cleburne, Stone, Van Buren, and White Counties, Arkansas (Figures 1-1 to 1-26). Interested parties such as private individuals or companies may file Expressions of Interest (EOIs) to nominate parcels for competitive bid and leasing by the BLM. The BLM Eastern States is required to hold quarterly competitive lease sales to sell available oil and gas lease parcels.

The parcels evaluated as part of the Proposed Action consists of federal mineral estate underlying privately owned land. A federal lease is a legal contract that grants exclusive rights to the lessee to develop federally-owned oil and gas resources but does not authorize surface-disturbing activities or obligate the lessee to drill a well on the parcel in the future. Should the parcels be leased and a detailed plan for oil and gas development on the parcels be identified, the BLM would conduct future site-specific environmental analysis prior to any ground disturbing activities. The Proposed Action evaluated in this EA is described in further detail in Chapter 2.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the United States Department of the Interior (DOI) NEPA requirements (Department Manual 516, Environmental Quality) and the BLM NEPA Handbook H-1790-1. The information presented within this document serves as the basis for the BLM Authorized Officer to decide whether implementation of the Proposed Action would result in a significant impact to the environment. If significant impacts are expected, then the BLM would prepare an Environmental Impact Statement (EIS). If no significant impacts are expected, the BLM would issue a Finding of No Significant Impact (FONSI).

1.2 Location of the Proposed Action

Seventeen (17) EOIs (Table ES-1) are located in Cleburne, Stone, Van Buren, and White Counties, Arkansas and contain 2766.06 acres. The proposed project sites are located in four counties of north-central Arkansas (see Figures 1-1 to 1-26).

EOI #630 107.5 acres, 1 parcel, Van Buren County
T.10N., R.14W., Sec. 34, NE1/4SW1/4, E1/2SE1/4SW1/4, SW1/4SE1/4, Part of
NW1/4SE1/4- approximately 107.5 acres

EOI #726 453.2 acres, 7 parcels, Cleburne County

T. 12N., R. 8W., Sec. 35 NWNW – 40 acres.

T. 12N., R. 8W., Sec. 2, Fractional NW – 13.2 acres.

T. 12N., R. 8W., Sec 8., NENE, NWSE – 80 acres,

T. 12N., R. 8W., Sec 9., E1/2NE, NESE – 120 acres,

T. 12N., R. 8W., Sec 10., NWSW – 40 acres,

T. 12N., R. 8W., Sec 15. NWNW – 40 acres, T. 12N., R. 8W., Sec 17., NWNW, NENW, SENW – 120 acres

EOI #728 325 acres, 2 parcels, Cleburne County
T. 12N., R. 10W., Sec. 9, N2NWSESW, N2N2SWSW, NWSW, NESW, NWSE,
SESE, N2SWSE, SESWSE – approximately 205 acres
T. 12N., R. 10W., Sec. 15, NWSW, SESW, SWSE – approximately 120 acres

EOI #730 40 acres, 1 parcel, Cleburne County T. 12N., R. 12W., Sec. 23, NESE – 40 acres

EOI #733 65 acres, 1 parcel, Van Buren County
Van Buren County, Arkansas, 5th Principal Meridian Fractional part of Southeast
Quarter of Southeast Quarter, all of said land east of Cadron Creek in said call, all
that part of the Southeast Quarter of Southeast Quarter lying south and east of
Cadron Creek, and all that part of the Southwest Quarter of Southeast lying south
of Cadron Creek – approximately 65 acres.

EOI #737 10.63 acres, 1 parcel, Van Buren County
T. 11N., R. 12W., Sec. 33, Part of the SWNW – approximately 10.63 acres

EOI #738

765.33 acres, 5 parcels, Van Buren County
T. 11N., R. 14W., Sec. 6, S2N2, NWNE, N2NW, W2SW – approximately 363.54 acres
T. 11N., R. 14W., Sec. 4, W2SE – approximately 80 acres
T. 11N., R. 14W., Sec. 18, W2NW, NESW – approximately 121.99 acres
T. 11N., R. 14W., Sec. 31, E2NE, SWNE – approximately 120 acres
T. 11N., R. 14W., Sec. 1, SWNW, Sec. 2, NENW – approximately 79.8 acres

EOI #739 507.5 acres, 7 parcels, Van Buren County

T. 11N., R. 15W., Sec. 1, NE1/4NE1/4, E1/2SE1/4 – approximately 120 acres T. 11N., R. 15W., Sec. 13, NE1/4NE1/4 – approximately 40 acres T. 11N., R. 15W., Sec. 23, SW1/4SE1/4 – approximately 40 acres T. 11N., R. 15W., Sec. 24, NW1/4NE1/4 – approximately 40 acres T. 11N., R. 15W., Sec. 26, S1/2NW1/4 – approximately 80 acres T.11N., R.15W., Sec. 26, S1/2NW1/4, S1/2SW1/4NW1/4, S1/2NW1/4SW1/4NW1/4, NW1/4NW1/4SW1/4NW1/4 – approximately 67.5 acres

 $T.\ 11N.,\ R.\ 15W.,\ Sec.\ 29,\ SE1/4SW1/4,\ S1/2SE1/4-approximately\ 120\ acres$

EOI #743 120 acres, 2 parcels, Van Buren County
T. 12N., R. 15W., Sec. 15, W2NE – approximately 80 acres
T. 12N., R. 15W., Sec. 26, NWNW – approximately 40 acres

EOI #961b 11.9 acres, 1 parcel, White County
T. 9N., R. 7W., Sec. 26, W2SE – approximately 11.9 acres

EOI #1086 80 acres, 1 parcel, Cleburne County T. 9N., R. 11W., Sec. 6, N1/2NE – approximately 80 acres EOI #1103 80 acres, 1 parcel, Stone County T. 13N., R. 12W., Sec. 36, S1/2SE – approximately 80 acres EOI #1148 40 acres, 1 parcel, Cleburne County T. 12N., R. 11W., Sec. 36, SESE – approximately 40 acres EOI #1174 20 acres, 1 parcel, Van Buren County T. 12N., R. 14W., Sec. 20 W1/2E1/2E1/2SE – approximately 20 acres EOI #1469 40 acres, 1 parcel, Cleburne County T. 12N., R. 11W., Sec. 24, SWSW – approximately 40 acres EOI #1770 80 acres, 2 parcels, Cleburne County T. 12N., R. 11W., Sec. 4 SESW – approximately 40 acres T. 12N., R. 11W., Sec. 23, SESE – approximately 40 acres EOI #1773 20 acres, 1 parcel, Cleburne County T. 11N., R. 12W., Sec. 1 W1/2NWNE – approximately 20 acres

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy, while minimizing adverse effects to natural and cultural resources. The BLM minimizes adverse effects to resources by identifying appropriate lease stipulations and notices, best management practices, and mitigations. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended [(30 United States Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which reduces the dependence of the United States on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

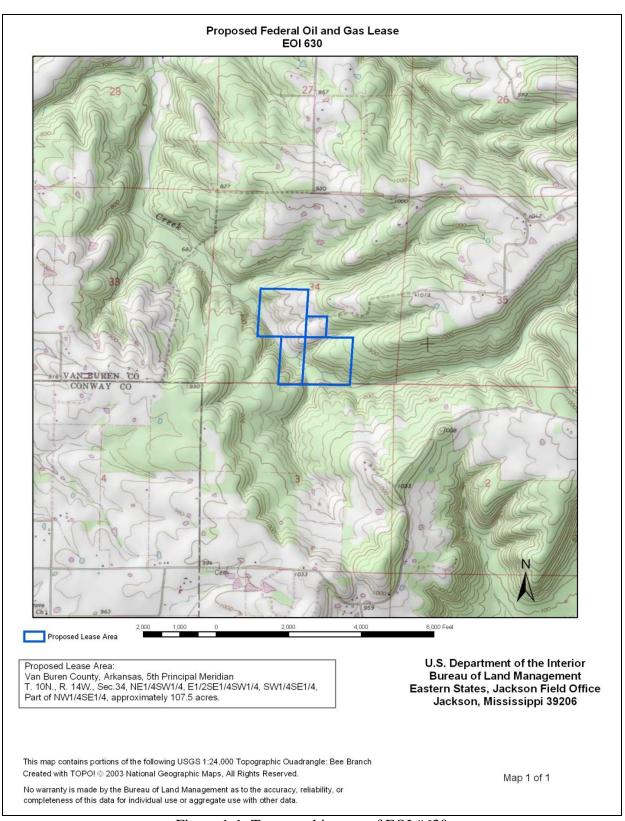


Figure 1-1. Topographic map of EOI #630.

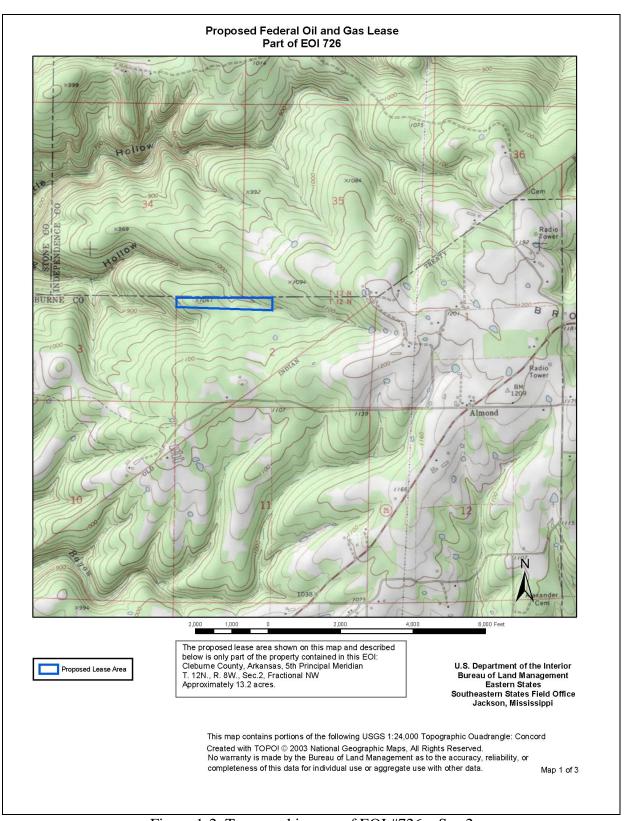
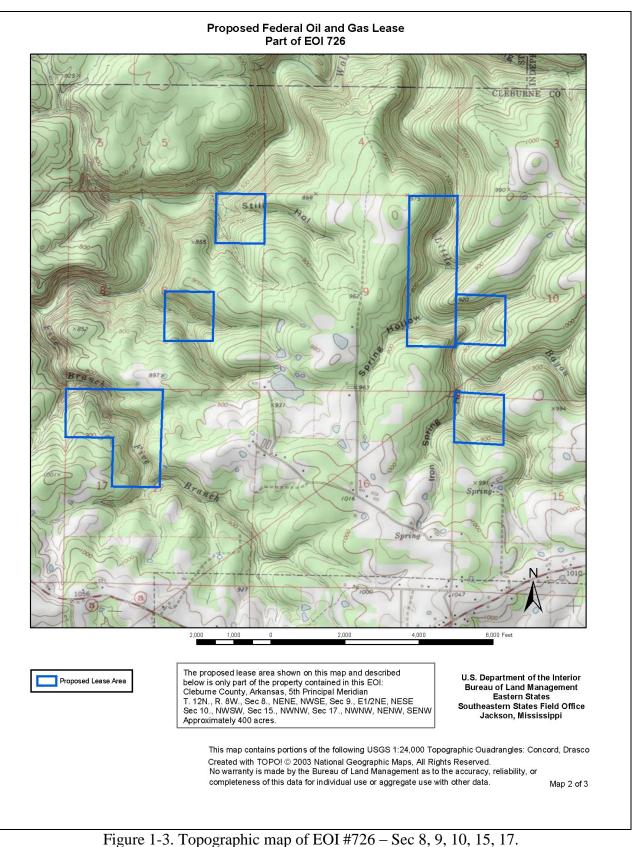


Figure 1-2. Topographic map of EOI #726 – Sec 2.



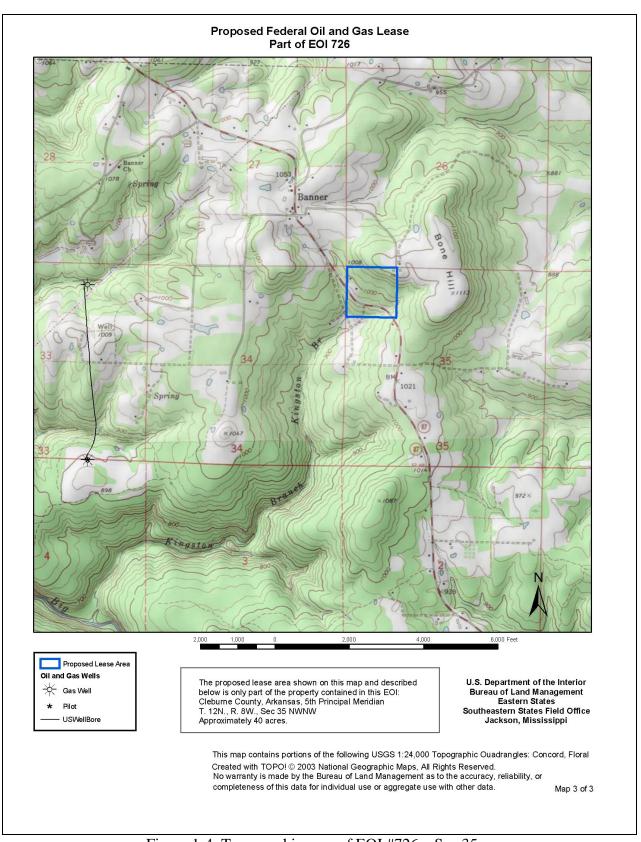


Figure 1-4. Topographic map of EOI #726 – Sec 35.

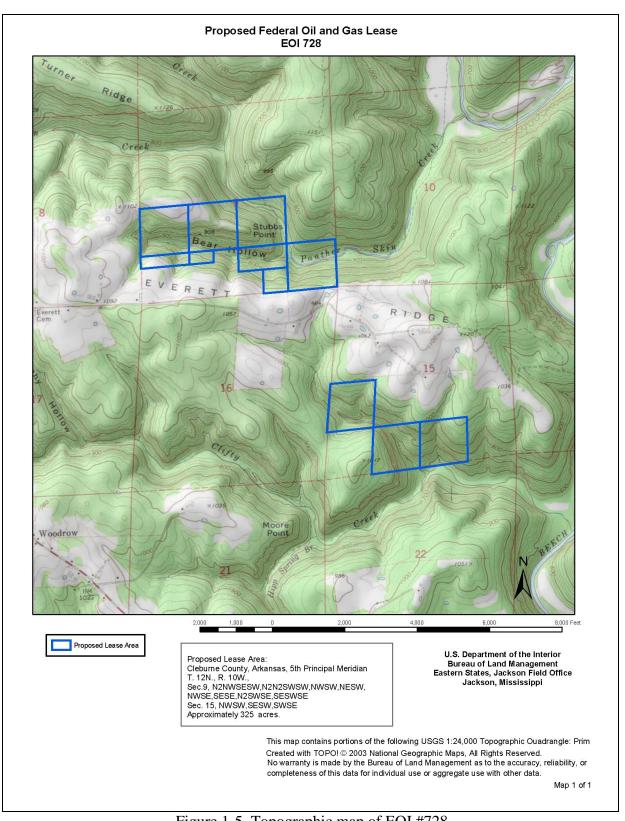


Figure 1-5. Topographic map of EOI #728.

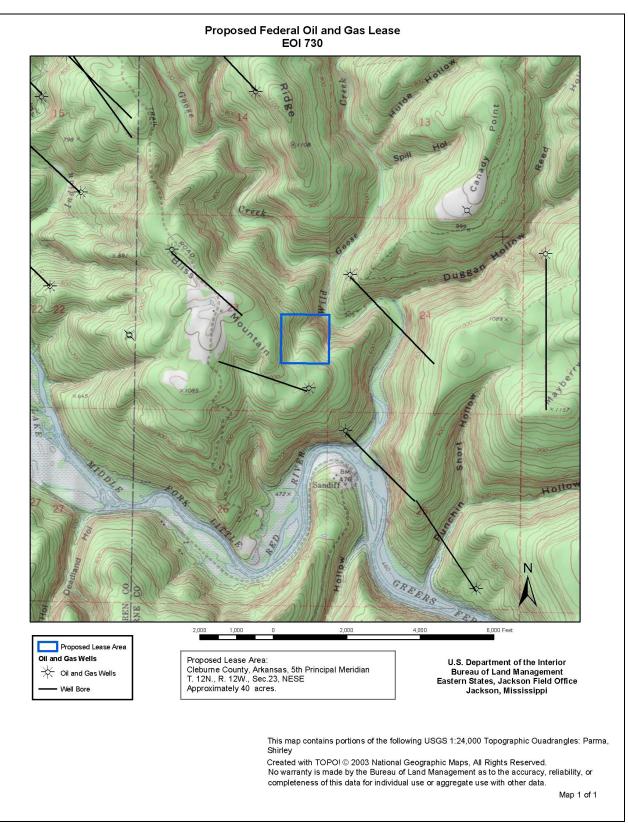


Figure 1-6. Topographic map of EOI #730.

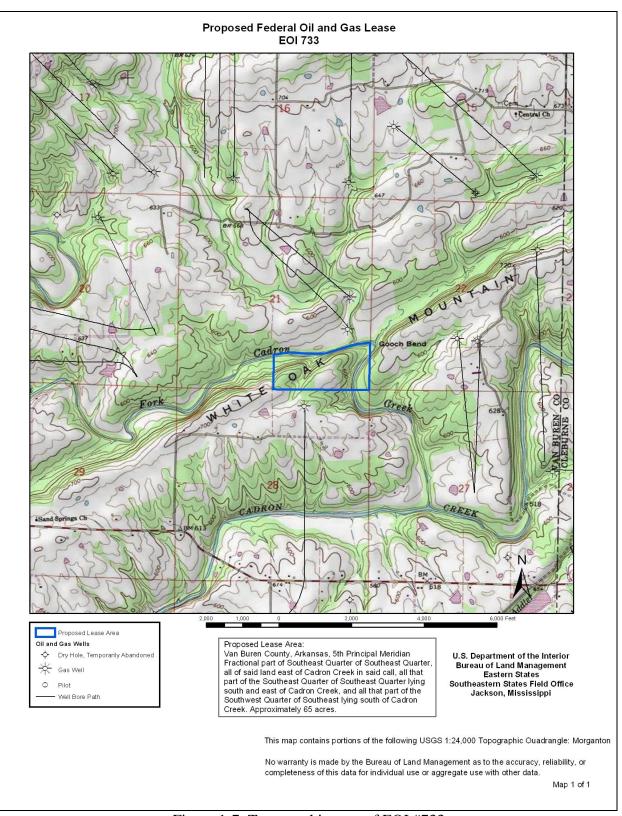


Figure 1-7. Topographic map of EOI #733.

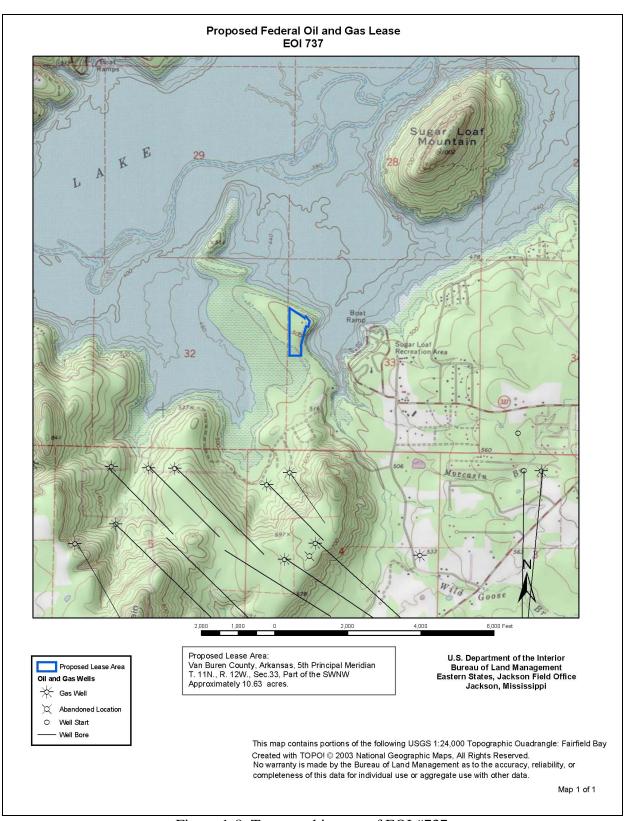


Figure 1-8. Topographic map of EOI #737.

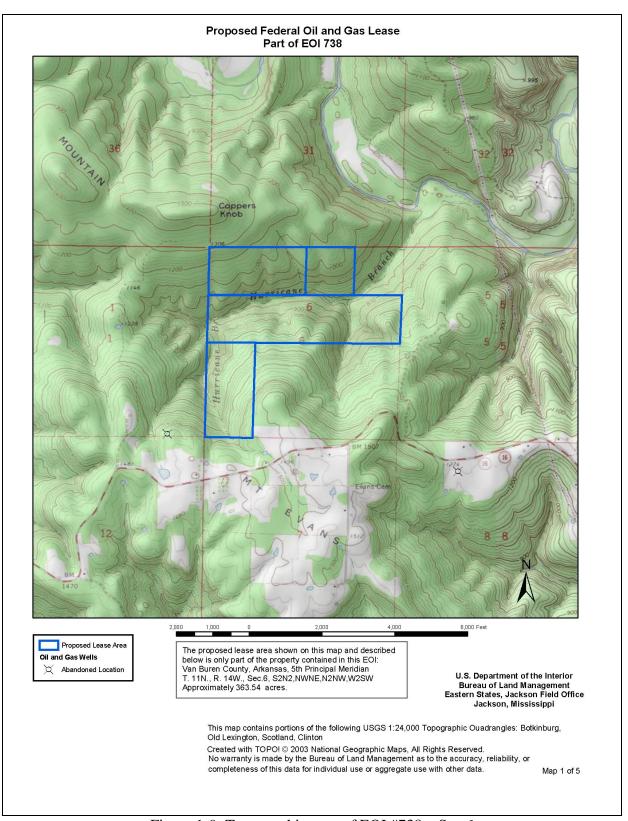


Figure 1-9. Topographic map of EOI #738 – Sec 6.

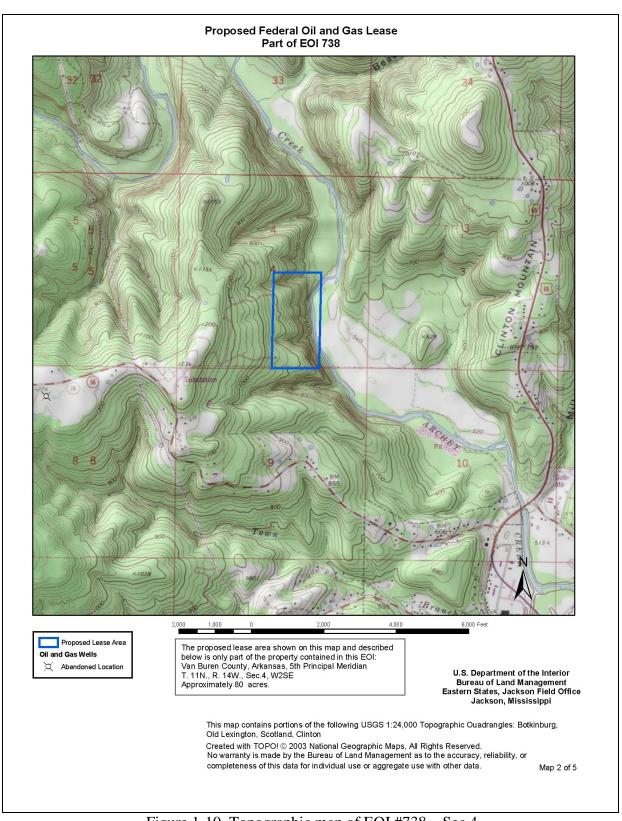


Figure 1-10. Topographic map of EOI #738 – Sec 4.

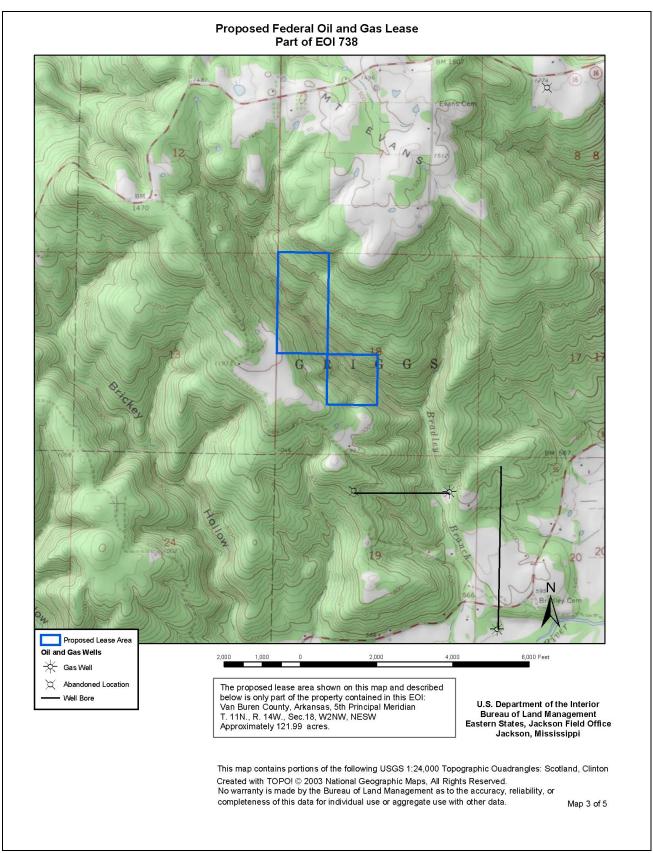


Figure 1-11. Topographic map of EOI #738 – Sec 18.

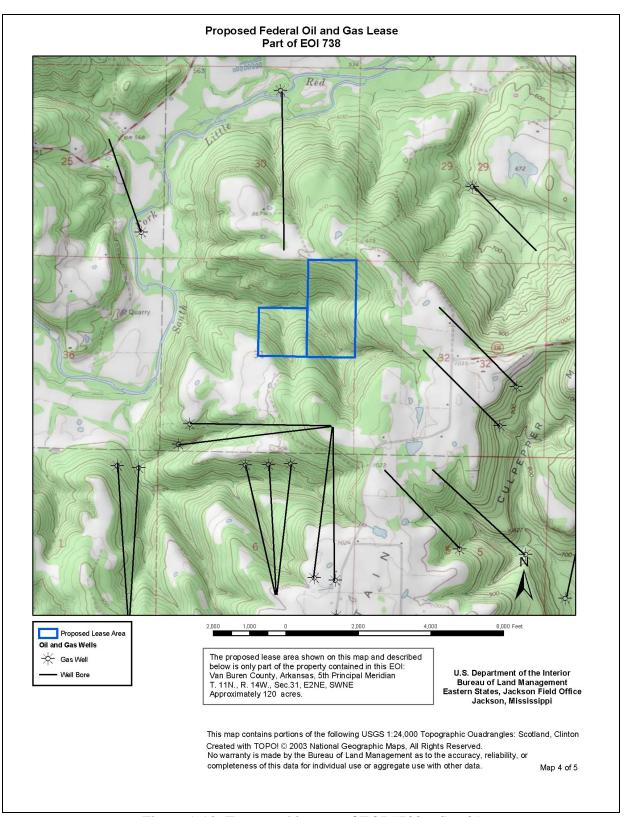
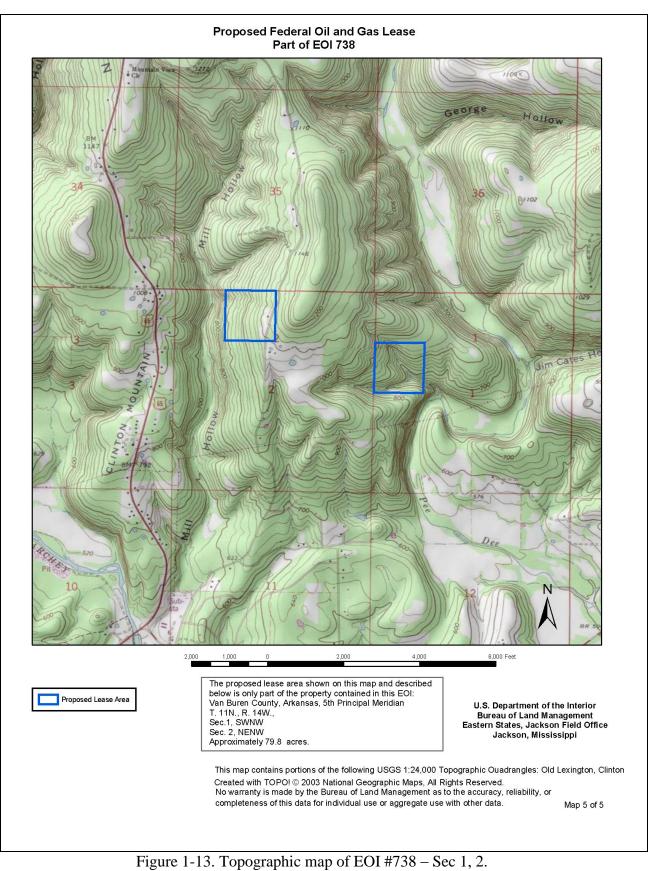


Figure 1-12. Topographic map of EOI #738 – Sec 31.



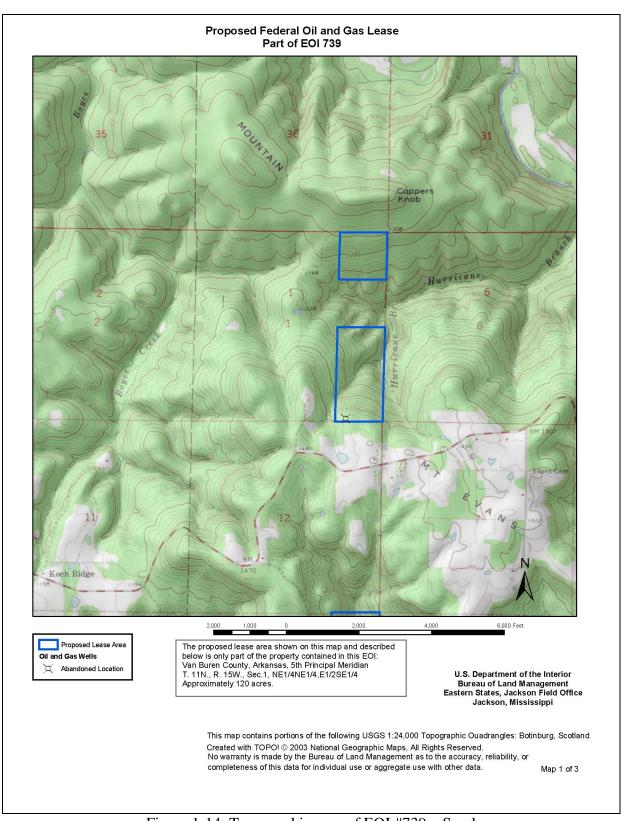


Figure 1-14. Topographic map of EOI #739 – Sec 1.

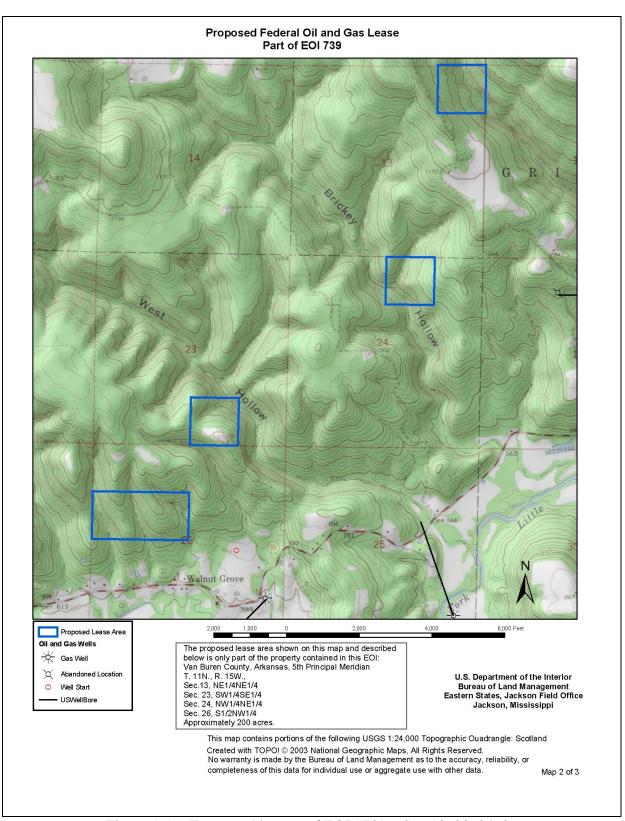


Figure 1-15. Topographic map of EOI #739 – Sec 13, 23, 24, 26.

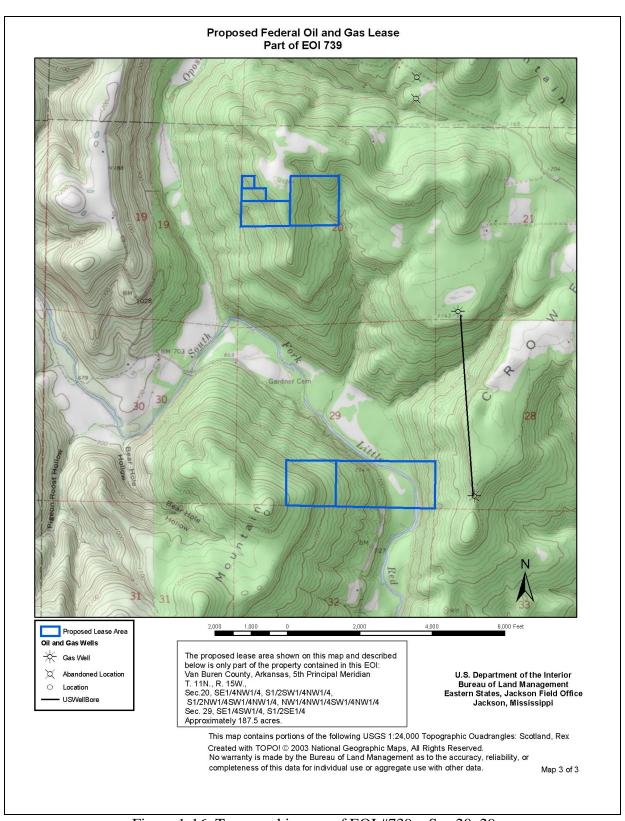


Figure 1-16. Topographic map of EOI #739 – Sec 20, 29.

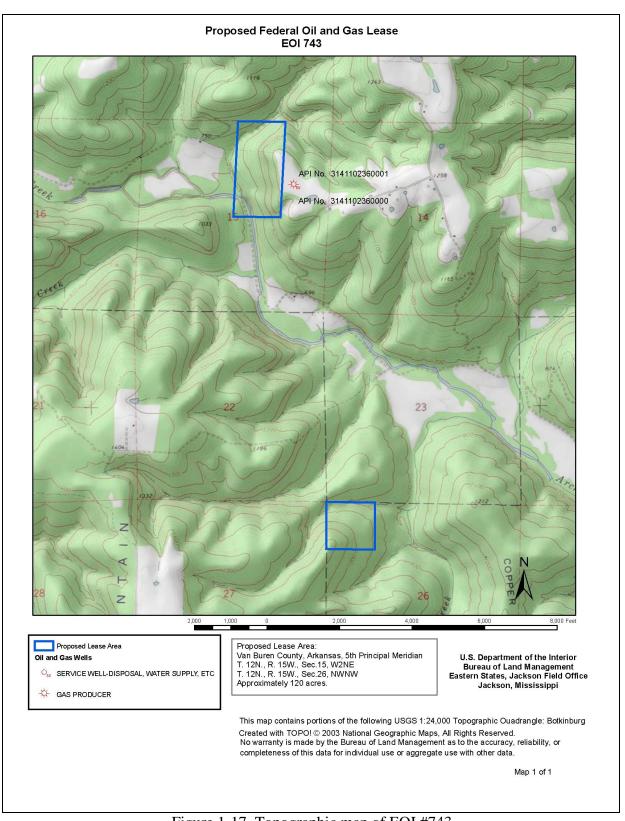
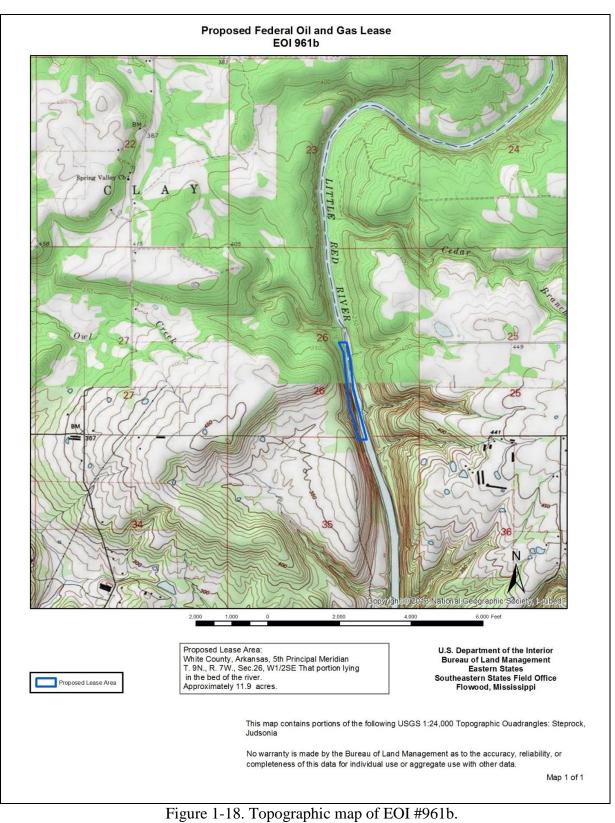


Figure 1-17. Topographic map of EOI #743.



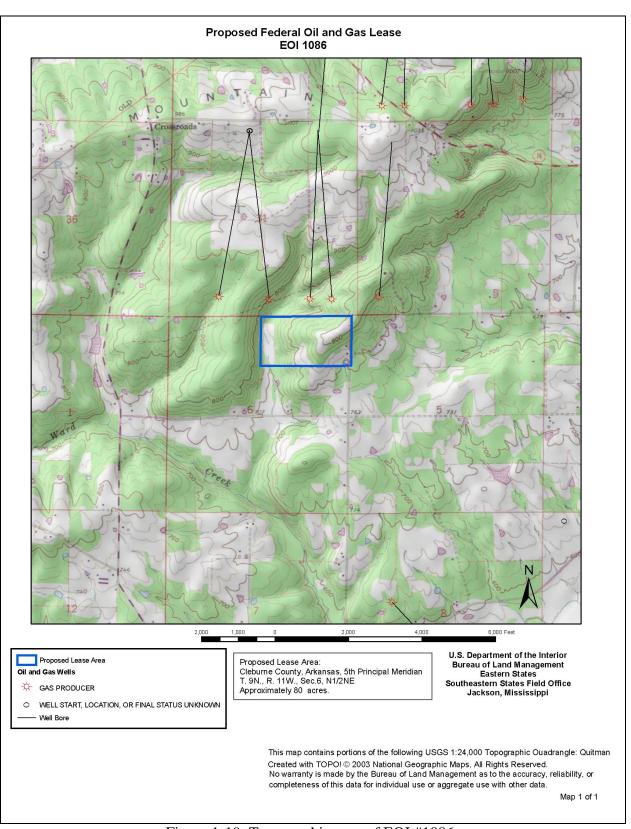


Figure 1-19. Topographic map of EOI #1086.

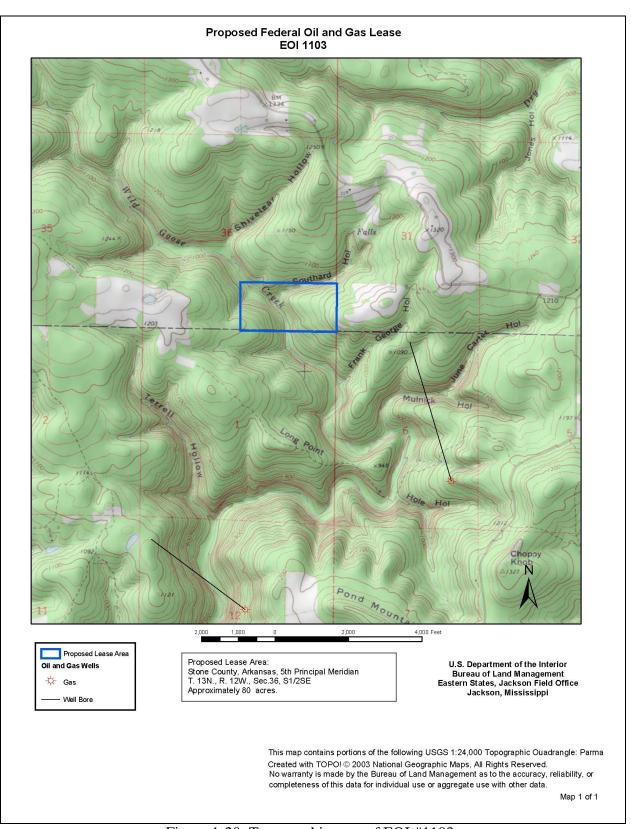


Figure 1-20. Topographic map of EOI #1103.

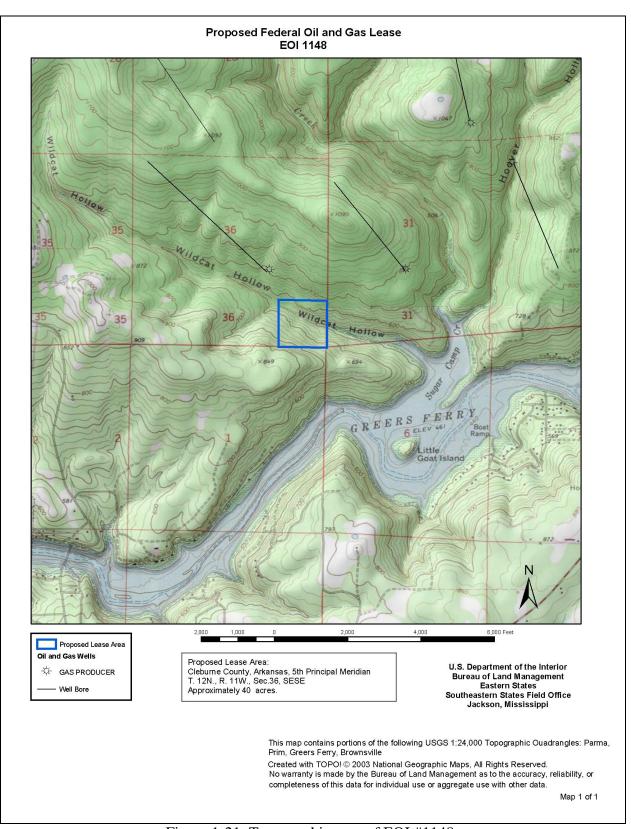


Figure 1-21. Topographic map of EOI #1148.

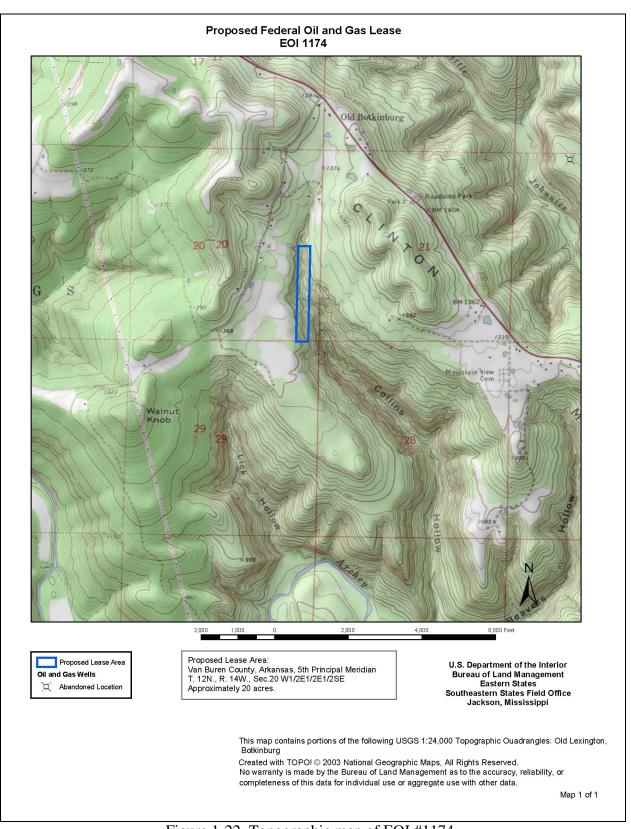


Figure 1-22. Topographic map of EOI #1174.

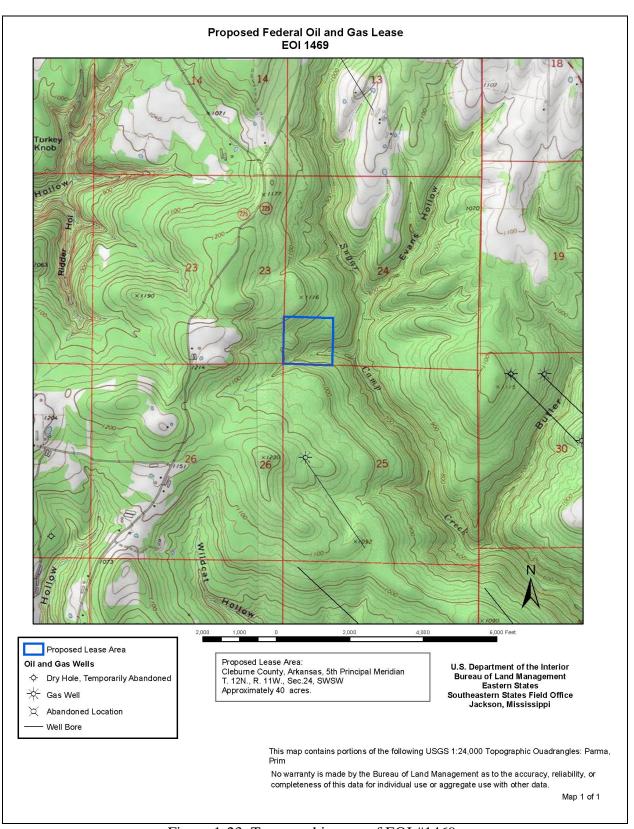


Figure 1-23. Topographic map of EOI #1469.

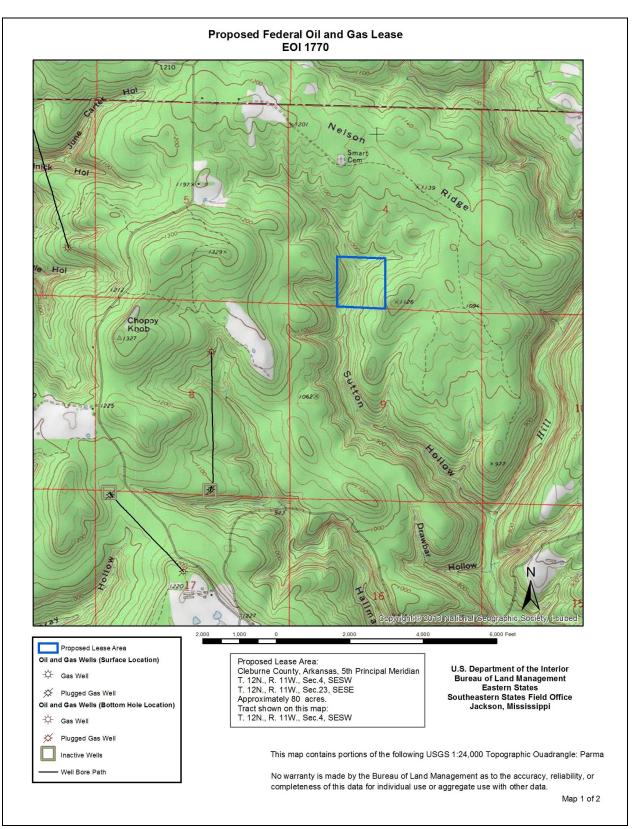


Figure 1-24. Topographic map of EOI #1770 – Sec 4.

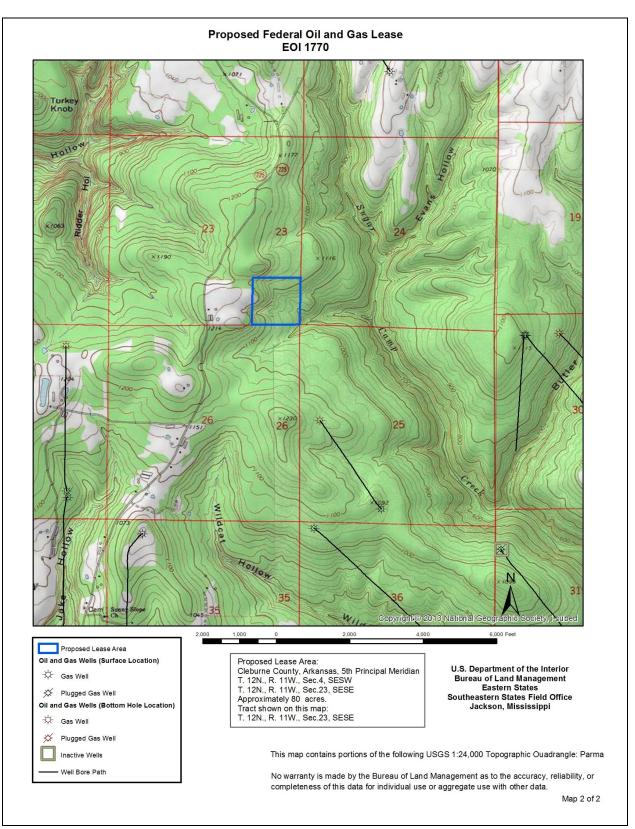


Figure 1-25. Topographic map of EOI #1770 – Sec 23.

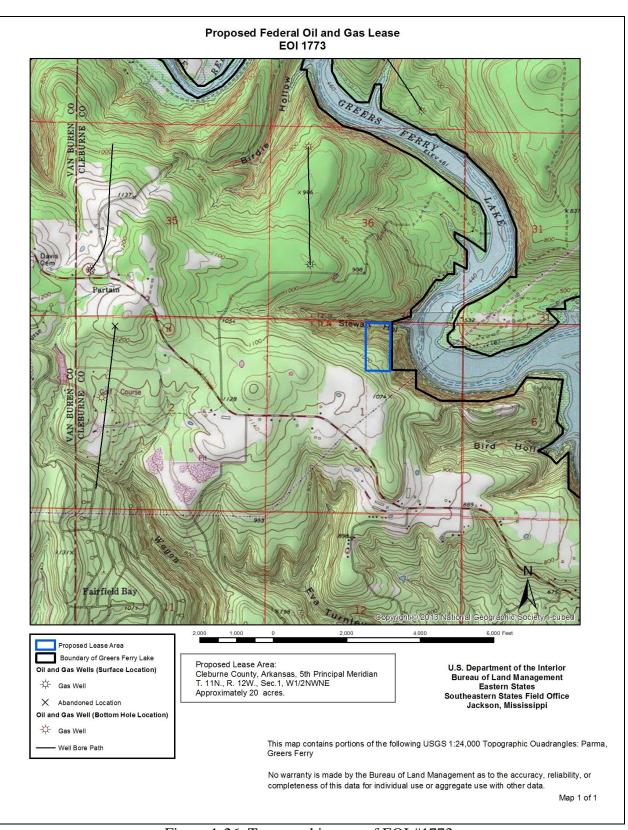


Figure 1-26. Topographic map of EOI #1773.

The leasing of federal minerals is vital to the United States oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to the seventeen (17) EOI #s listed in Table ES-1 consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

1.4 Land Use Plan Conformance

The Proposed Action does not conflict with any known state or local planning or zoning law, regulation, policy or ordinance. The proposed lease areas in Arkansas are not covered by a BLM Resource Management Plan; however, according to the regulations at 43 CFR 1610.8 (b) (1), this EA will be used as a basis for making a decision on the Proposed Action.

1.5 Relationship to Statutes, Regulations, and Other Plans

In addressing environmental considerations of the Proposed Action, the BLM is guided by relevant statutes (and their implementing regulations) and Executive Orders that establish standards and provide guidance on environmental and natural resources management and planning. These include but are not limited to the following:

- NEPA (1969) and the associated Council on Environmental Quality regulations at 43 CFR Parts 1500-1508
- FLPMA (1976) as amended and the associated regulations at 43 CFR Part 1600
- Mineral Leasing Act (MLA) (1920), as amended and supplemented (30 USC 181),
- National Historic Preservation Act (NHPA) (1966) as amended and the associated regulations at 36 CFR Part 800
- American Indian Religious Freedom Act
- Native American Graves Protection and Repatriation Act
- Endangered Species Act (ESA) (1973) as amended
- Clean Water Act (1977)
- Clean Air Act (1970) as amended
- Federal Onshore Oil and Gas Leasing Reform Act (FOOGLA)
- Migratory Bird Treaty Act (MBTA) (1918)
- Resource Conservation and Recovery Act (RCRA) (1976) as amended
- Executive Order (EO) 11988- Floodplain Management
- EO 119900 Protection of Wetlands
- EO 12898 Environmental Justice in Minority Populations and Low-Income Populations
- EO 13007 Indian Sacred Sites
- Oil and Gas Leasing Reform Land Use Planning and Lease Parcel Reviews (BLM WO IM 2010-117)

1.6 Decision to be Made

The BLM's policy is to promote oil and gas development if it meets the guidelines and regulations set forth by NEPA and other subsequent laws and policies of the United States. Therefore, the BLM must decide whether to lease the nominated parcels and if so, under what terms and conditions (Appendix A contains the proposed lease stipulations).

1.7 Scoping and Public Involvement

1.7.1 Internal Scoping

A BLM interdisciplinary team consisting of a Land Law Examiner, Planning and Environmental Coordinator, Planning and Environmental Specialist, Geologist, GIS Specialist, and Archaeologist reviewed the EOI and prepared the EA. The interdisciplinary team used various sources of information to prepare the EA, including existing data inventories, online resources, and information collected onsite. The BLM conducted site visits in March, April, May, and June 2017 to document the physical characteristics of sites and collect information on baseline conditions. No major issues of concern were identified during internal scoping.

1.7.2 External Scoping

The BLM conducted and completed the required informal consultation with the United States Fish and Wildlife Service (USFWS) in compliance with the ESA Section 7 consultation requirements. The BLM also conducted and completed the required consultation with the Arkansas State Historic Preservation Office (SHPO) and Native American tribes. The BLM initiated informal consultation with USFWS on August 25, 2017. A concurrence letter was received on October 13, 2017 and is located in Appendix B. Consultation with the SHPO and coordination with the tribes occurred from March 8, 2017 to May 31, 2017. The BLM received concurrence letters from SHPO from March 20, 2017 to May 31, 2017 (Appendix B). Responses were received from 7 tribes from March 15, 2017 to May 31, 2017 (Table 1-1) agreeing that cultural resource studies are warranted prior to approval of any development proposals.

The following tribes were contacted to notify them of the Proposed Action and to request comments or concerns:

- Arkansas Historic Preservation Program
- Arkansas Natural Heritage Commission
- United Keetoowah Band of Cherokee
- Shawnee Tribe
- Seminole Nation of Oklahoma
- Osage Nation
- Cherokee Nation
- Absentee Shawnee Tribe of Oklahoma
- Eastern Shawnee Tribe
- Absentee Shawnee Tribe
- Alabama-Quassarte Tribal Town

- Delaware Tribe
- Delaware Nation
- Tunica-Biloxi Tribe of Louisiana
- Eastern Band of Cherokee
- Cherokee Nation of Oklahoma
- Quapaw Tribe of Oklahoma

Table 1-1. 2017 Arkansas SHPO Consultation and Response Dates and Tribal Response Dates.

EOI #	SHPO	United Keetoowah Band of Cherokee	Shawnee Tribe	Seminole Nation of Oklahoma	Osage Nation	Cherokee Nation	Absentee Shawnee Tribe	Eastern Shawnee Tribe
EOI 630	March 8; Mar 20	April 26	March 23	March 20	April 26	March 22	March 15	
EOI 726	April 4; April 10			April 24	May 26	April 24		
EOI 728	April 4; April 10			April 24	May 26	April 24		
EOI 730	April 4; April 10			April 24	May 26	April 24		
EOI 733	April 10; April 14				May 26	April 25		
EOI 737	April 10; April 14				May 26			May 31
EOI 738	April 11; April 18				May 26	April 25		
EOI 739	April 11; April 18				May 26	April 25		
EOI 743	April 11; April 18				May 26	April 25		May 31
EOI 1086	April 5; April 10			April 24	May 26	April 24		
EOI 1103	April 3; April 10	April 26			May 26	April 24	April 26	
EOI 1148	April 5; April 10			April 24	May 26	April 24		
EOI 1174	April 11; April 18				May 26	April 25		May 31
EOI 1469	April 4; April 10			April 24	May 26	April 24	April 25	
EOI 1770	March 9; March 20		March 23	April 3	April 26	March 29	March 17	March 15
EOI 1773	March 9; March 20			April 3	April 26	March 29	March 17	March 15

All agency and tribal correspondence is included in Appendix B of this EA.

1.7.3 Public Involvement

The BLM invites public participation in the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables more informed decision making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are encouraged to participate in the decision making process.

The EA was made available for a 30-day review period. The lease sale notice is posted to the BLM Eastern States webpage at least 90 days prior to the sale and the National NEPA Register project webpage – typically 90 days prior to the sale but at a minimum of 45 days prior to the sale, which is required by regulation. Posting of the lease sale notice initiates a 30-day protest period for the proposed lease sale parcels.

2.0 CHAPTER 2 – DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The CEQ's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act establish a number of policies for federal agencies, including "using the NEPA process to identify and assess reasonable alternatives to the Proposed Action that would avoid or minimize adverse effects of these actions on the quality of the human environment" (40 CFR 1500.2 (e)). This chapter provides a detailed description of the Proposed Action and alternatives carried forward for analysis in the EA.

2.1 Proposed Action

The Proposed Action is to lease 2766.06 acres of federal minerals located in Cleburne, Stone, Van Buren, and White Counties, Arkansas for potential future oil and gas development. The proposed leases would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities. Before a lease owner or operator conducts any surface disturbing activities related to the development of this lease to access the federal minerals, the BLM must first approve an application for permit to drill (APD) as specified in Title 43 CFR 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM also conducts additional site-specific NEPA analysis and the appropriate consultations under the ESA and NHPA prior to approving the APD. Although there would be no surface disturbance from the action of leasing, this EA analyzes a reasonably foreseeable development (RFD) scenario to address the potential environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this point in time. For example, estimates can be made on the most likely number of wells that could be constructed, but the locations may change at the APD stage.

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, or does not make annual

rental payments, or does not comply with the terms and conditions of the lease, or relinquishes the lease, then ownership of the minerals reverts back to the federal government.

2.1.1 RFD Scenario for Potential Oil and Gas Development for EOI #s in Table ES-1.

The 2766.06 acres listed in Table ES-1 consists of federally owned mineral estate underlying privately owned surface (split-estate). Reasonably foreseeable activities that could occur as a result of future oil and gas development associated with leasing these parcels include surface disturbance associated with preparation for drilling including construction of a road, drilling pad, and reserve pit (Table 2.1). The total surface disturbance predicted under the RFD scenario is approximately 240.14 acres, which includes projected surface disturbance associated with well pads and pits (approximately 206.59 acres) and construction of access roads (approximately 33.58 acres) (Appendix C). The RFD scenario projects that multiple wells may be drilled from existing well pads. Vertical wells would not penetrate federal minerals but horizontal wells may pass through federal minerals.

Table 2.1 RFD Scenario Disturbances (acres) for Arkansas EOI #s.

File #	State and County	EOI Acres	Access Roads	Well Pad and Pit	Utility and/or Pipeline ROW	Initial Disturbance	Partial Reclamation	Net Disturbance
EOI 630	AR, Van Buren County	107.5	0.34	4.9	0 –Use access rd ROW	5.24	0.34	4.9
EOI 726	AR, Cleburne County	453.2	3.44	34.15	0 –Use access rd ROW	37.59	2.38	35.21
EOI 728	AR, Cleburne County	325	3.44	19.6	0 –Use access rd ROW	23.01	1.36	21.65
EOI 730	AR, Cleburne County	40	1.7	4.9	0 –Use access rd ROW	6.6	0.34	6.26
EOI 733	AR, Van Buren County	65	0.52	5.74	0 –Use access rd ROW	6.26	0.34	5.92
EOI 737	AR, Van Buren County	10.63	0.34	4.9	0 –Use access rd ROW	5.24	0.34	4.9
EOI 738	AR, Van Buren County	765.33	6.68	34.3	0 –Use access rd ROW	40.98	4.08	36.9
EOI 739	AR, Van Buren County	507.5	8.06	39.2	0 –Use access rd ROW	47.26	3.74	43.52
EOI 743	AR, Van Buren County	120	0.90	9.8	0 –Use access rd ROW	10.7	0.68	10.02
EOI 961b	AR, White County	11.9	0.52	5.74	0 – Use access rd ROW	6.26	0.34	5.92

EOI 1086	AR, Cleburne County	80	1.58	4.9	0 –Use access rd ROW	6.48	0.34	6.14
EOI 1103	AR, Stone County	80	0.14	4.88	0 –Use access rd ROW	5.02	0.34	4.68
EOI 1148	AR, Cleburne County	40	1.24	4.88	0 –Use access rd ROW	6.12	0.34	5.78
EOI 1174	AR, Van Buren County	20	0.55	4.88	0 –Use access rd ROW	5.43	0.34	5.09
EOI 1469	AR, Cleburne County	40	2.07	5.74	0 –Use access rd ROW	7.81	0.5	7.76
EOI 1770	AR, Cleburne County	80	1.72	12.05	0 –Use access rd ROW	13.77	0.68	13.09
EOI 1773	AR, Cleburne County	20	0.34	6.03	0 –Use access rd ROW	6.37	0.34	6.03

Constructed access roads normally have a running surface width of approximately 30 feet; the length is dependent upon the well site location in relation to existing roads or highways. The average length of road construction is approximately 0.5 miles. Typically, seven acres are cleared and graded level for the construction of the drilling pad. If the well produces natural gas, and the flowline is in the road, another 0.5 acres may be affected by flowline construction. These disturbances are typical for private or federal ownership well pad locations. However, specific disturbance acreage for each EOI is listed above in Table 2-1. The excavation reserve pit is typically about five feet deep and is lined with bentonite clay to retain drilling fluids, circulated mud, and cuttings. Plastic or butyl liners (or its equivalent), that meet state standards for thickness and quality, are used on occasions when soils are determined incapable of holding pit fluids.

Drilling typically continues around the clock. Once drilling is completed, excess fluids are pumped out of the pit and disposed of in a state authorized disposal site and the cuttings are buried. The RFD scenario assumes that wells would be drilled by rotary drilling using mud as the circulating medium. Mud pumps would be used to force mud down the drillpipe, thereby forcing the rock cuttings out the wellbore. Water would normally be obtained from a well drilled on the site, however, water could be pumped to the site from a local pond, stream or lake through a pipe laid on the surface. Approximately 1,500 barrels of drilling mud would be typically kept on the location. If a tract is adjacent to a producing field and water production is expected during the life of the field, separation, dehydration and other production processing may be necessary. Construction of facilities off the federal lease may be needed to handle this processing. Some processing or temporary storage may be necessary on site.

During well pad construction, the topsoil would likely be stockpiled for use during restoration activities. If the well is successful, the drill pad would be reduced to about 100 feet x 100 feet with the remaining surface area, including the reserve pit, re-graded and restored as per the surface owner/surface management agency requirements. A lease notice for the proposed leases

encourages the use of non-invasive cover plants during all restoration and stabilization activities and is attached to the proposed leases. Final seed mixtures and plantings are determined with recommendations from BLM with approval of the land owner. The remaining 100 feet x 100 feet pad would be maintained for the life of the well. The life of a productive well may be 25 years. Following abandonment, the pad is subject to the same restoration parameters.

Appendix A contains the lease stipulations and lease notices for the parcel. These recommended lease stipulations and notices have been developed by BLM to provide general habitat protection and setbacks. Additional surveys or consultations may be required after site-specific proposals have been received by BLM during the development phase.

2.2 No Action Alternative

Under the No Action Alternative, the BLM would not offer for competitive bid or lease the proposed 2766.06 acres of federal mineral estate for potential future oil and gas development. Not leasing the seventeen (17) EOIs listed in Table ES-1 would not meet the purpose of and need for the Proposed Action. CEQ guidelines (40 CFR 1502) stipulate that the No Action Alternative should be analyzed to assess any environmental consequences that may occur if the Proposed Action is not implemented and to serve as a baseline for comparing impacts of the Proposed Action. Therefore, the No Action Alternative has been retained for analysis in this EA.

2.3 Alternatives Considered but Dismissed

The seventeen (17) EOIs listed in Table ES-1 contain 2766.06 acres; however, BLM did not consider any other alternatives aside from the Proposed Action and the No Action Alternative. However, prior to signing the Decision Record for this EA, the BLM Authorized Officer will make a determination on whether all 17 parcels would be offered for lease, based on the analysis presented in this EA.

3.0 CHAPTER 3 – DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter describes the environment that would potentially be affected by implementation of the Proposed Action, as required by CEQ regulations for implementing NEPA (40 CFR Parts 1500-1508). The discussion in this chapter focuses on the relevant resources and issues and only those elements of the affected environment that have the potential to be affected are described in detail.

Based on a review of the context and scale of the Proposed Action, the following resources are discussed in detail in this EA: Land Use, Visual/Noise/Recreation Resources, Socioeconomics and Environmental Justice, Cultural Resources and Native American Concerns, Minerals and Mineral Development, Wastes, Soils, Air Resources, Water Resources – Surface/Ground Water, Wetlands/Riparian Areas/Floodplains and Natural Resources including; Invasive/Exotic Species, Vegetation and Wildlife, Special Status Species, Migratory Birds of Concern, Public Health and Safety, and Transportation.

The following resources have been eliminated from further discussion from the EA, because either the resource is not present or there are no anticipated effects to the resource. A brief summary explaining why the resource was eliminated is also provided below.

- <u>Lands with Wilderness Characteristics</u>, <u>Areas of Critical Environmental Concern</u>, <u>Wilderness Study Areas</u>, <u>Wild and Scenic Rivers</u>. There are six (6) Wilderness Areas (WAs), eight (8) Wild and Scenic Rivers, and four (4) U.S. Forest Service Experimental Forests in Arkansas.
- The six (6) WAs are: Black Fork, Caney Creek, Flatside, Leatherwood, Richland Creek, and Upper Buffalo. Under authority of the Wilderness Act of 1964, Congress established the Caney Creek and Upper Buffalo WAs in 1975 (P.L. 93-622). Caney Creek WA is part of the Ouachita National Forest (NF) and located primarily in Polk County, Arkansas but also reaches into other counties in Arkansas and Oklahoma. The Upper Buffalo WA is part of the Ozark-St. Francis National Forest and located in western Newton County, Arkansas. These WAs were designated as Class I air quality areas by Congress in August, 1977 (UFWS 2015). The eastern side of Upper Buffalo WA is ~ 45 miles west-northwest from the nearest EOIs EOI #739 and 743 in Van Buren County (and ~ 90 miles from the most distant EOI EOI #726 in Cleburne County). Caney Creek WA is ~ 116 miles southwest of the nearest EOI EOI #630 in Van Buren County (and ~ 156 miles southwest of the most distant EOI EOI #726 in Cleburne County).

Black Fork, Flatside, Leatherwood, and Richland Creek WAs were designated and signed into law in 1984. Black Fork and Flatside WAs are part of the Ouachita NF. Black Fork is located in Polk and Scott Counties in Arkansas and Leflore County, OK. Black Fork is ~ 112 miles southwest from the nearest EOI. Flatside is located primarily in Saline County, Arkansas; ~ 50 miles southwest of the nearest EOI. Leatherwood and Richland Creek WAs are part of the Ozark-St. Francis NF; located respectively in Baxter and Newton Counties, AR. Leatherwood and Richland Creek WAs are ~ 27 miles north and 27 miles northwest, respectively, to the nearest EOI.

- The Federally-designated eight (8) Wild and Scenic Rivers are: Big Piney Creek, Buffalo River, Cossatot River, Hurricane Creek, Little Missouri River, Mulberry River, North Sylamore Creek, and Richland Creek. The nearest Wild and Scenic River to the proposed leases is Big Piney Creek, approximately 12 miles west of the nearest EOI EOI #739, near Scotland, Arkansas. The next closest is North Sylamore Creek ~ 16 miles northeast of EOI #1103 near Blanchard Spring and Blanchard Caverns; followed by Hurricane Creek near the Johnson, Newton, Pope County junction ~ 34 miles west of EOI #743.
- There are four (4) U.S. Forest Service Experimental Forests in Arkansas: Alum Creek, Crossett, Henry R. Koen, and Sylamore. Alum Creek and Crossett are located in the Ouachita NF while Henry R. Koen and Sylamore are located in the Ozark-St. Francis NF. The nearest Experimental Forest to the proposed leases is Sylamore ~ 23 miles north and slightly east of EOI #1103.

• BLM has determined that there are no anticipated adverse effects to these WAs, Wild and Scenic Rivers, or Experimental Forests from the proposed leases due to the following reasons: there are no Wilderness Areas, Areas of Critical Environmental Concern, or Wild and Scenic Rivers present on or in the immediate vicinity of proposed lease parcels.

3.1 Land Use

All 17 EOIs fall into one of two physiographic ecoregions: Arkansas River Valley or the Boston Mountain sub-region of the Ozark Plateau (Figure 3-1 illustration).

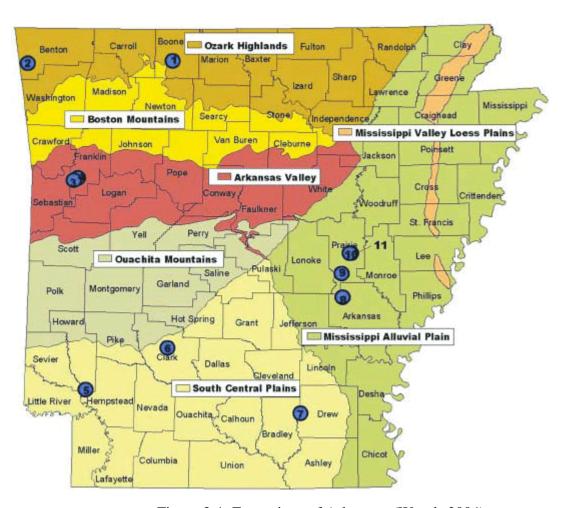


Figure 3-1. Ecoregions of Arkansas. (Woods 2004).

Arkansas River Valley

According to the USGS (Woods, A.J., et al. "Ecoregions of Arkansas." Reston, VA: U.S. Geological Survey, 2004. Online at http://www.epa.gov/wed/pages/ecoregions/ar_eco.htm. Accessed March 16, 2017), this region is characterized by uplifted plateaus, folded ridges, and steep-sided mountains with flat tops but also contains broad, rolling uplands. Ridges are typically sharp-pointed and run in an east-west direction as do primary stream waterways (Encyclopedia of Arkansas, 2017). Native dominant vegetation consists of hardwood slope forest interspersed with varying concentrations of shortleaf pine (*Pinus echinata*); especially on south and west

facing slopes. The surrounding area within a two-mile buffer exhibits typical land use patterns in the Arkansas Valley Hills. This use pattern consists of forested woodland slopes along sloping drainages and rocky outcroppings with cleared fields occupying flatter, more level terrain for livestock farming, pasture, and hay-production.

This Ecoregion contains five (5) full EOIs, and two (2) partial EOIs, of the seventeen (17) EOIs proposed (630, 733, 737, partial 738, 961b, 1086, partial 1770).

Ozark Plateau (Boston Mountain sub-region)

According to the USGS (Woods, A.J., et al. "Ecoregions of Arkansas." Reston, VA: U.S. Geological Survey, 2004. Online at http://www.epa.gov/wed/pages/ecoregions/ar eco.htm. Accessed March 16, 2017), this region is characterized by three dissected plateaus covered in oak (*Quercus*)-dominated forest with some glade or savannah presence. Short-leaf and Virginia pine (*Pinus virginiana*) occur; especially on south or west facing slopes. Underlying rock is sandstone and shale from the Mississippian and Pennsylvanian eras (Encyclopedia of Arkansas, 2017). Extreme topographic disparity exists in this region. Stream pathways run mainly north-south, from higher elevations to lower mimicking the dendritic form of tree branches (Encyclopedia of Arkansas 2017). Human population and industry growth is much less in this region than further south in the Arkansas River Valley. Small clearings are present on ridgetops and toe-slopes. Forested woodlands remain prevalent. Primary usage includes logging, native pasture, and poultry production.

This Ecoregion contains ten (10) full EOIs, and two (2) partial EOIs, of the seventeen (17) EOIs proposed on the lease sale (726, 728, 730, partial 738, 739, 743, 1103, 1148, 1174, 1469, partial 1770, 1773).

EOI #630

EOI #630 consists of one (1) parcel of approximately 107.5 acres privately owned surface located in north-central Arkansas (Van Buren County), part of the Arkansas River Valley physiographic region. The proposed project site is located at T.10N., R.14W., Sec. 34, NE1/4SW1/4, E1/2SE1/4SW1/4, SW1/4SE1/4, Part of NW1/4SE1/4 (Figure 1-1).

Formosa is the nearest town, located on State Highway 9, approximately 2.5-3 miles west of EOI #630. The nearest larger town is Clinton, AR (population 2,602 according to the 2010 U.S. Census Bureau), the Van Buren county seat, located approximately 12 miles north on U.S. Highway 65. The parcel is located approximately 5 miles south and west of the southwestern tip of Greers Ferry Lake, U.S. Army Corps of Engineers. Road access is located on Zachary Road Lane south off Harmony Mountain Road.

EOI #630 is forested with Choctaw Creek transecting the parcel from northwest to southeast. The majority of the parcel is located to the north and east of Choctaw Creek. The parcel is contains several older homeplaces, an old barn and a more recent recreational cabin. It consists of a combination of old pasturelands now grown over and small, older scattered woodlots. It is currently managed for recreation and forestry.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Arkansas Valley Hills. This use pattern consists of forested woodland slopes along drainages and rocky outcroppings with cleared fields occupying flatter, more level terrain for livestock farming, pasture, and hay-production.



Figure 3-2. Aerial view of EOI #630.



Figure 3-3. Aerial broad view of EOI #630.

EOI #726 consists of seven (7) parcels totaling approximately 453.2 acres of privately owned surface, all located in the northeastern corner of Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel site(s) are located at the following locations (Figures 1-2 to 1-4):

- T. 12N., R. 8W., Sec. 35 NWNW (approximately 40 acres),
- T. 12N., R. 8W., Sec. 2, Fractional NW (approximately 13.2 acres),
- T. 12N., R. 8W., Sec 8., NENE, NWSE (approximately 80 acres),
- T. 12N., R. 8W., Sec 9., E1/2NE, NESE (approximately 120 acres),
- T. 12N., R. 8W., Sec 10., NWSW (approximately 40 acres),
- T. 12N., R. 8W., Sec 15. NWNW (approximately 40 acres),
- T. 12N., R. 8W., Sec 17., NWNW, NENW, SENW (approximately 120 acres) (Figures 1-2 to 1-4).

Section 2 parcel, 13.2 acres, contains a portion of the upper head of Womack Spring Hollow. Section 8 parcels, two separate 40 acres, contain a portion of Wolf Bayou and an unnamed tributary of Five Branch. Section 9 and 10 parcels contain portions of Little Bayou, a tributary of Wolf Bayou, eventually draining into the White River. Section 15 parcel, 40 acres, contains a portion of Iron Spring in the northwest corner and an unnamed tributary draining into Iron Spring from the east. Section 17 parcel, 120 acres, is transected northwest-southeast by Five Branch, ultimately draining into the White River approximately 6 miles north. Section 35 parcel, 40 acres, contains no known waterbody.

Concord is the nearest town (population 244 according to the 2010 U.S. Census Bureau) located on State Highway 25, approximately 2 miles south of EOI #726. The largest nearer town is Heber Springs, the county seat for Cleburne County, 22 miles southwest with a population of 7206 (U.S. Census Bureau, 2010). Road access is from Spinks Road for the Section 2 parcel, Bullard Road for Sections 8, 9, 10, and 17 parcels, Arkansas State Highway 25 for the Section 15 parcel, and Arkansas State Highway 87 for the Section 35 parcel.

Section 2 (13.2 acres) and a portion of Section 8 (20 acres) parcels are investment properties. Another portion of Section 8 (20 acres) is a private residence. The remaining 40 acres in Section 8 parcel is a recreational hunting property. Sections 9 and 10 have at least two residences present on the parcels. Sections 15 and 17 each have one residence. In addition, Section 17 parcel is part of a working cattle ranch on the east side of Five Branch.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Boston Mountain sub-region of the Ozark Plateau. This use pattern consists of primarily hardwood forest occasionally mixed with pine (*Pinus spp*) occupying steep, rugged slopes along drainages and rocky outcroppings with small openings occupying broad ridges and nearly level toe-slopes of steeper areas for livestock farming, pasture, and hay-production.



Figure 3-4. Aerial view of EOI #726 – Sec 2.



Figure 3-5. Aerial broad view of EOI #726 – Sec 2.



Figure 3-6. Aerial view of EOI #726 – Sec 8, 9, 10, 15, 17.



Figure 3-7. Aerial broad view of EOI #726 – Sec 8, 9, 10, 15, 17.

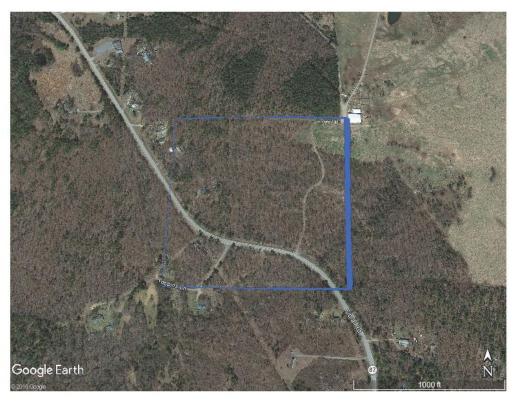


Figure 3-8. Aerial view of EOI #726 – Sec 35.



Figure 3-9. Aerial broad view of EOI #726 – Sec 35.

EOI #728 consists of two (2) parcels totaling approximately 325 acres of privately owned surface in northwestern Cleburne County within 3 miles east of Prim, Arkansas in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel site(s) are located at

T. 12N., R. 10W., Sec. 9, N2NWSESW, N2N2SWSW, NWSW, NESW, NWSE, SESE, N2SWSE, SESWSE – (approximately 205 acres) and

T. 12N., R. 10W., Sec. 15, NWSW, SESW, SWSE – (approximately 120 acres).

The eastern portion of Section 9 parcel contains approximately 0.5 mile stretch of Panther Skin Creek and a small, unnamed tributary in the bottom of Bear Hollow while Section 15 contains a small bendway of Clifty Creek, a tributary of Beech Fork that is a significant drainage into the Devils Fork of the Little Red River. Prim is the nearest unincorporated community located at the junction of Arkansas Highway 225 and Arkansas Highway 263, approximately 14 miles north-northeast of Greers Ferry, Arkansas. Greers Ferry is the nearest larger town whose population was 891 in 2010 (U.S. Census Bureau, 2010). Road access is from Everett Ridge Road.

The Section 9 parcel is owned by two landowners. The western portion of this parcel (95 acres) is part of a working cattle farm divided by Bear Hollow. One large upland pasture (~15 acres) occupies the northwestern portion of the parcel and a smaller pasture on the southwestern corner. The remaining parcel (110 acres) of Section 9 and the Section 15 parcel (120 acres) are managed for recreation and forestry.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Boston Mountain sub-region of the Ozark Plateau.



Figure 3-10. Aerial view of EOI #728 – Sec 9.



Figure 3-11. Aerial broad view of EOI #728 – Sec 9.

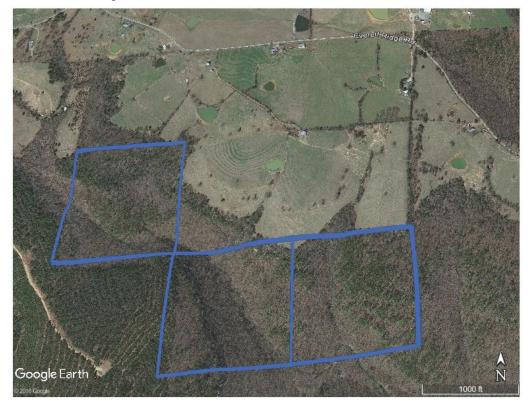


Figure 3-12. Aerial view of EOI #728 – Sec 15.



Figure 3-13. Aerial broad view of EOI #728 – Sec 15.

EOI #730 consists of one (1) parcel totaling 40 acres of privately owned surface in the northwest corner of Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel is located on the eastern slope of Bliss Mountain at T. 12N., R. 12W., Sec. 23, NESE – (approximately 40 acres).

Wild Goose Creek runs through the northeastern corner of the parcel and meets the Middle Fork of the Little Red River less than one (1) mile to the south. The nearest community is the township of Brewer, approximately 3 miles (air miles) east of EOI #730. The nearest town is Shirley, Arkansas (population 223 in the U.S. Census Bureau, 2010), approximately 5 miles west of the parcel in northeastern Van Buren County. The nearest road access is Rushing Trail Road; however, there is private land between this parcel and Rushing Trail Road.

EOI #730 is a land-locked parcel completely wooded in mature pine-hardwoods. There are no residences present and the landowner manages the property for wildlife, hunting, and forestry.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Boston Mountain sub-region of the Ozark Plateau.



Figure 3-14. Aerial view of EOI #730.



Figure 3-15. Aerial broad view of EOI #730.

EOI #733 consists of one (1) parcel totaling approximately 65 acres of privately owned surface in the southeastern corner of Van Buren County in north-central Arkansas, part of the Arkansas River Valley physiographic region. The proposed parcel is located at

Van Buren County, Arkansas, 5th Principal Meridian Fractional part of Southeast Quarter of Southeast Quarter, all of said land east of Cadron Creek in said call, all that part of the Southeast Quarter of Southeast Quarter lying south and east of Cadron Creek, and all that part of the Southwest Quarter of Southeast lying south of Cadron Creek – (approximately 65 acres).

EOI #733's northern border is the North Fork of Cadron Creek along the northern base of White Oak Mountain. The North Fork of Cadron also crosses through the southeastern corner of the parcel. The parcel location is approximately 8 miles south-west of the Cove Creek Public Use Area in Goff Cove on Greers Ferry Lake. The nearest town is Quitman in Cleburne County, approximately 3 miles to the East on Arkansas State Highway 124, population 714 (U.S. Census Bureau, 2014). Road access is by Shady Meadow Road north of Arkansas State Highway 124 between Quitman, AR and Gravesville, AR.

EOI #733 contains one large, fenced central livestock pasture surrounded by mature hardwood forest along the banks of the North Fork Cadron Creek bounding the parcel on two sides. According to the Arkansas Natural Heritage Commission (ANHC), the North Fork of Cadron Creek is a state-designated Natural and Scenic River. It has one landowner resident who lives on the adjacent parcel to the south and uses the property for livestock farming and pasture production.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Arkansas Valley Hills.



Figure 3-16. Aerial view of EOI #733.



Figure 3-17. Aerial broad view of EOI #733.

EOI #737 consists of one (1) parcel totaling approximately 10.63 acres of privately owned surface in eastern Van Buren County in north-central Arkansas, part of the Arkansas River Valley physiographic region. The proposed parcel is located on the south bank of Greers Ferry Lake at

T. 11N., R. 12W., Sec. 33, Part of the SWNW – (approximately 10.63 acres).

EOI #737 contains no known waterbody. It is located approximately one (1) mile west of the Sugar Loaf Recreation Area boat ramp and four (4) miles southwest of Sugar Loaf Mountain on Greers Ferry Lake. Road access is by State Road 337, then Lake Cliff Road to Phelps Lane. The nearest town is Higden, population 120 (U.S. Census Bureau, 2010), approximately 4 miles to the east on Arkansas Highways 16 and 92, in Cleburne County. The nearest larger town is Heber Springs, the county seat for Cleburne County, 15 miles east with a population of 7206 (U.S. Census Bureau, 2010). EOI #737 lies adjacent to a state Wildlife Management Area (WMA) boundary, Greers Ferry Lake WMA.

EOI #737 appears to be managed for hunting and forestry. Two hunting blinds, a deer feeder, and two abandoned structures are present. The parcel sits out on a small peninsula in Greers Ferry Lake but does not touch the waterfront due to U.S. Army Corps of Engineers (USACE) buffer land surrounding the property on three sides.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Arkansas Valley Hills.



Figure 3-18. Aerial view of EOI #737.

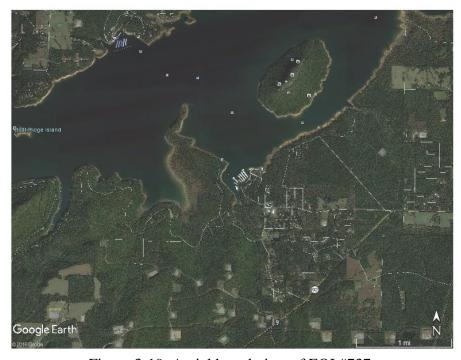


Figure 3-19. Aerial broad view of EOI #737.

EOI #738 consists of five (5) parcels totaling approximately 765.33 acres of privately owned surface in central Van Buren County in north-central Arkansas. Four (4) of these parcels totaling

approximately 645.33 acres are part of the Ozark Plateau physiographic region. One (1) T. 11N., R. 14W., Sec. 31, E2NE, SWNE totaling approximately 120 acres is part of the Arkansas River Valley physiographic region. The proposed parcels are located at the following locations:

- T. 11N., R. 14W., Sec. 6, S2N2, NWNE, N2NW, W2SW (approximately 363.54 acres),
- T. 11N., R. 14W., Sec. 4, W2SE (approximately 80 acres),
- T. 11N., R. 14W., Sec. 18, W2NW, NESW (approximately 121.99 acres),
- T. 11N., R. 14W., Sec. 31, E2NE, SWNE (approximately 120 acres),
- T. 11N., R. 14W., Sec. 1, SWNW, Sec. 2, NENW (approximately 79.8 acres).

Hurricane Branch, Archey Creek, and Bradley Branch are known water bodies present within proposed parcel EOI #738 boundaries that have the potential to impact the nearby South Fork of the Little Red River. All five (5) EOI #738 parcels are located within an approximate 5 mile radius around Clinton, Arkansas (population 2,602 in U.S. Census Bureau, 2010). Parcels located in Sections 6, 4, and 18 are accessible by roadways off Arkansas State Highway 16 west of Clinton, Arkansas. Section 31 parcel, 120 acres, is accessible by Gilmore Road, southwest of Clinton, Arkansas. Section 1 parcels, two separate 40 acre parcels, are accessible by Henderson Road, northeast of Clinton, Arkansas.

A private timber corporation owns and manages a large portion (360 acres) of this EOI #738 for commercial timber production of planted loblolly pine (*Pinus taeda*) (Sections 1, 6, 18) and for hunting lease property. Ten private landowners own the remaining parcels in Sections 2, 4, 6, 18, and 31. Two owners have two residences located on the 40 acre parcel in Section 2. Four landowners own the 80 acre parcel in Section 4 with one establishing residence on the parcel. The other three owners manage the mature hardwood parcel for personal recreation and forestry purposes. The private landowner of the parcel portion in Section 6, 120 acres, manages for wildlife and forestry as does the landowner for Section 18 (40 acres). The two landowners, 120 acres, in Section 31 manage for forestry, hunting, and for livestock farming.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Boston Mountain sub-region of the Ozark Plateau.



Figure 3-20. Aerial view of EOI #738 – Sec 6.



Figure 3-21. Aerial broad view of EOI #738 – Sec 6.



Figure 3-22. Aerial view of EOI #738 - Sec 4.



Figure 3-23. Aerial broad view of EOI #738 – Sec 4.



Figure 3-24. Aerial view of EOI #738 – Sec 18.



Figure 3-25. Aerial broad view of EOI #738 – Sec 18.

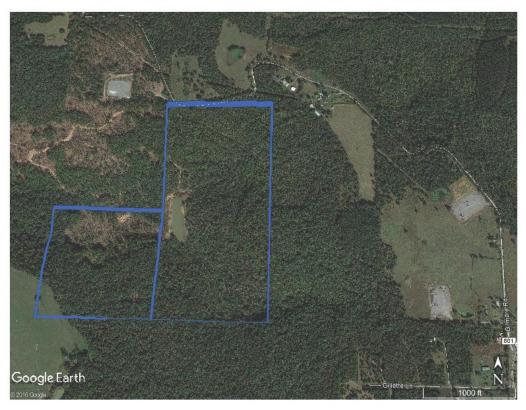


Figure 3-26. Aerial view of EOI #738 – Sec 31.



Figure 3-27. Aerial broad view of EOI #738 – Sec 31.



Figure 3-28. Aerial view of EOI #738 - Sec 1, 2.



Figure 3-29. Aerial broad view of EOI #738 - Sec 1, 2.

EOI #739 consists of seven (7) parcels totaling approximately 507.5 acres of privately owned surface in central Van Buren County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcels are located at the following locations:

- T. 11N., R. 15W., Sec. 1, NE1/4NE1/4, E1/2SE1/4 (approximately 120 acres),
- T. 11N., R. 15W., Sec. 13, NE1/4NE1/4 (approximately 40 acres),
- T. 11N., R. 15W., Sec. 23, SW1/4SE1/4 (approximately 40 acres),
- T. 11N., R. 15W., Sec. 24, NW1/4NE1/4 (approximately 40 acres),
- T. 11N., R. 15W., Sec. 26, S1/2NW1/4 (approximately 80 acres),
- T. 11N., R. 15W., Sec. 20, SE1/4NW1/4, S1/2SW1/4NW1/4, S1/2NW1/4SW1/4NW1/4, NW1/4NW1/4SW1/4NW1/4 (approximately 67.5 acres),
- T. 11N., R. 15W., Sec. 29, SE1/4SW1/4, S1/2SE1/4 (approximately 120 acres).

Hurricane Branch, tributaries draining Brickey and West Hollows, and the South Fork of the Little Red River are water bodies present within proposed parcel EOI #739 boundaries. EOI #739, Section 23 parcel and one of the Section 26 parcels are privately-owned timber company lands that help make up a state WMA, Cherokee WMA (Area #6). All seven (7) EOI #739 parcels are located within an approximately 4-mile radius around Koch Ridge, Arkansas located on Arkansas State Highway 16 near the eastern border of Cherokee Wildlife Management Area in Van Buren County, Arkansas.

A private timber corporation owns and manages a large portion (195 acres) of EOI #739 for commercial timber production of planted loblolly pine (Sections 13, 20, 23, 26) and for hunting lease property. Five private landowners own the remaining parcels in Sections 1, 24, 26, and 29 and manage these mature hardwood stands - primarily for personal recreation and forestry purposes. The private landowner portion of Section 26 contains the ruins of an old cabin site.



Figure 3-30. Aerial view of EOI #739 - Sec 1.



Figure 3-31. Aerial broad view of EOI #739 – Sec 1.



Figure 3-32. Aerial view of EOI #739 – Sec 13, 23, 24, 26.



Figure 3-33. Aerial broad view of EOI #739 – Sec 13, 23, 24, 26.

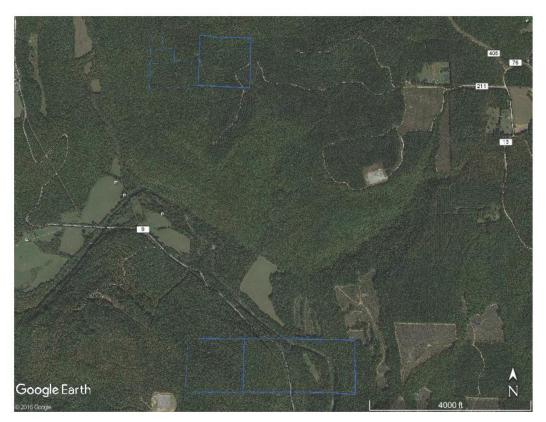


Figure 3-34. Aerial view of EOI #739 – Sec 20, 29.



Figure 3-35. Aerial broad view of EOI #739 – Sec 20, 29.

EOI #743 consists of two (2) parcels totaling approximately 120 acres of privately owned surface in northwestern Van Buren County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcels are located at

T. 12N., R. 15W., Sec. 15, W2NE – (approximately 80 acres) and

T. 12N., R. 15W., Sec. 26, NWNW – (approximately 40 acres).

Both parcels are located within 4 miles north and slightly west of Copper Spring Mountain (1520 ft.) and 6 miles north of Koch Ridge, Arkansas located on Arkansas State Highway 16. The 80 acre parcel in Section 15 is part of Scott Henderson Gulf WMA, owned by Arkansas Game and Fish Commission (AGFC). Archey Creek is present on the southwestern corner of this parcel. The nearest road access to the Section 15 parcel is Rocky Hill Road off State Highway 254 near the Searcy County line; however, there is no public access through surrounding private property. The nearest road access to the Section 26 parcel is Sawmill Road off State Highway 16 west of Clinton, Arkansas and similarly lacks public access.

There are no known residences. Both parcels are heavily wooded. Primary use is expected to be forestry, recreation, hunting, and wildlife. A small portion of the Section 15 parcel lies in an open field owned by the adjacent landowner and contains a dormant gas well. The field is primarily used for hay production (personal communication with adjacent landowner).



Figure 3-36. Aerial view of EOI #743 – Sec 15.



Figure 3-37. Aerial broad view of EOI #743 – Sec 15.



Figure 3-38. Aerial view of EOI #743 – Sec 26.



Figure 3-39. Aerial broad view of EOI #743 – Sec 26.

EOI #961b

EOI #961b is a single parcel totaling approximately 11.9 acres of privately owned surface in western White County in central Arkansas, part of the Arkansas River valley physiographic region. The proposed parcel is located at

T. 9N., R. 7W., Sec. 26, W2SE – (approximately 11.9 acres).

This parcel is located approximately three (3) miles west of Arkansas State Highway 157 near Providence, Arkansas. Nearest road access is Pratt road from the west or Warren road from the east. Permission was not obtained for a reconnaissance site visit to EOI #961b. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), and USGS topographic quadrangle 1:24,000 maps.

Much of the parcel appears to be located lying within the actual riverbed of the Little Red River. The remainder of the parcel is composed of steep, wooded bluffs leading to the western riverbank. The land located west of this parcel was previously also leased for oil and gas mineral development in 2013. The Little Red River is not classified as navigable water by the state of Arkansas. Primary use is expected to be for recreational, wildlife, hunting, fishing, and aesthetic purposes.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Arkansas Valley Hills.



Figure 3-40. Aerial view of EOI #961b.



Figure 3-41. Aerial broad view of EOI #961b.

EOI #1086 is a single parcel totaling approximately 80 acres of privately owned surface in southwestern Cleburne County in north-central Arkansas, part of the Arkansas River Valley physiographic region. The proposed parcel is located at

T. 9N., R. 11W., Sec. 6, N1/2NE – (approximately 80 acres).

An unnamed, intermittent tributary runs south down the west boundary of EOI #1086 and drains into Ward Creek. A small pond for livestock is located in the southeastern corner. This parcel is located approximately one (1) mile east of Arkansas State Highway 225 between Quitman, Arkansas and Crossroads, Arkansas. It is 0.5 mile north of the intersection of Wilderness Road and Miller Point Road South. EOI #1086 is accessible by Miller Point Road South.

Multiple small pastures on this tract are fenced for pasture and livestock production. There is one residence occupying the tract. A majority of the tract is managed and utilized for wildlife recreation.

The surrounding area within a two-mile buffer exhibits typical land use patterns in the Arkansas Valley Hills.

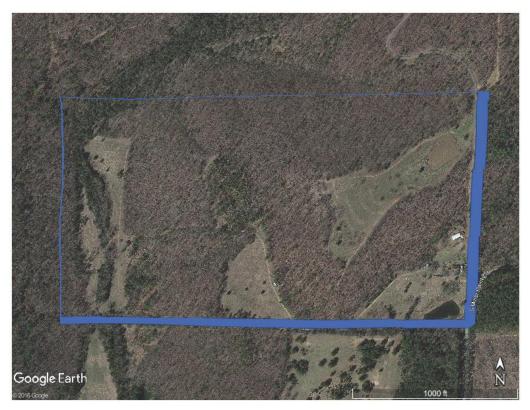


Figure 3-42. Aerial view of EOI #1086.

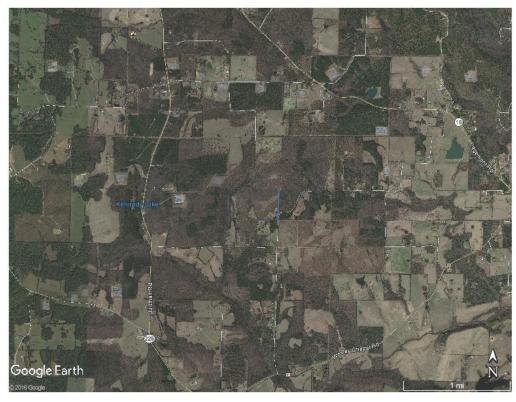


Figure 3-43. Aerial broad view of EOI #1086.

EOI #1103 is a single parcel totaling approximately 80 acres of privately owned surface in southern Stone County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel is located at

T. 13N., R. 12W., Sec. 36, S1/2SE – (approximately 80 acres).

This parcel is located approximately two (2) miles west of Parma, Arkansas and one (1) mile west of Arkansas State Highway 263 in southern Stone County. The southern boundary of EOI #1103 is the Stone/Cleburne County line. EOI #1103 is approximately one —and-a-half (1.5) miles due north of Pond Mountain (1300 ft). Wild Goose Creek runs through the western portion of the parcel.

There are no residences on the property. According to the landowner, there is one old homestead location on the property along with a spring but no known existence of karst formations. The primary use of this property is for hunting and recreation.



Figure 3-44. Aerial view of EOI #1103.



Figure 3-45. Aerial broad view of EOI #1103.

EOI #1148 is a single parcel totaling approximately 40 acres of privately owned surface in northern Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel is located at

T. 12N., R. 11W., Sec. 36, SESE – (approximately 40 acres).

EOI #1148 is located near the Sugar Camp Creek area of the Devils Fork Little Red River in Greers Ferry Lake. This parcel sits near the mouth of Wildcat Hollow approximately one-half (0.5) mile northwest of Little Goat Island in Greers Ferry Lake. EOI #1148 is near a state WMA boundary, Greers Ferry Lake WMA.

A private timber corporation owns and manages EOI #1148 for commercial timber production of planted loblolly pine and for hunting lease property.



Figure 3-46. Aerial view of EOI #1148.



Figure 3-47. Aerial broad view of EOI #1148.

EOI #1174 is a single parcel totaling approximately 20 acres of privately owned surface in north-central Van Buren County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel is located at

T. 12N., R. 14W., Sec. 20 W1/2E1/2E1/2SE – (approximately 20 acres).

EOI #1174 is located one (1) mile south of the Old Bodkinburg, Arkansas and one-half (0.5) mile west of Clinton Mountain (1580 ft) in the northern reach of Collins Hollow.

There are no known residences or natural outstanding features present.



Figure 3-48. Aerial view of EOI #1174.



Figure 3-49. Aerial broad view of EOI #1174.

EOI #1469 is a single parcel totaling approximately 40 acres of privately owned surface in northwest Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel is located at

T. 12N., R. 11W., Sec. 24, SWSW – (approximately 40 acres).

EOI #1469 is located approximately three (3) miles south and slightly west of Prim, Arkansas. The parcel is on the west side of Sugar Camp Creek, less than ¼ (0.25) mile southwest of the juncture of Evans Hollow and Sugar Camp Creek to the northeast parcel corner. For road access, the parcel is one-half (0.5) mile east of Arkansas State Highway 225, one (1) mile south of the State Highway 225 / Brewer Road intersection, one-half (0.5) mile north of the State Highway 225/ Skylark Drive intersection. There is one small, unnamed tributary flowing eastward along the southern edge of this parcel.

EOI #1770 contains a 40 acre parcel in adjacent Section 23 owned by the same landowner adjoining this parcel on the west. Both 40 acre parcels are landlocked by neighboring landowners. EOI #1469, as well as the neighboring EOI #1770, is utilized as a single property for generating annual lease income from hunting rights.



Figure 3-50. Aerial view of EOI #1469.



Figure 3-51. Aerial broad view of EOI #1469.

EOI #1770 consists of two (2) parcels totaling approximately 80 acres of privately owned surface in northwest Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcels are located at

T. 12N., R. 11W., Sec. 4 SESW – (approximately 40 acres) and

T. 12N., R. 11W., Sec. 23, SESE – (approximately 40 acres).

EOI #1770 Sec. 4 parcel is located approximately one (1) mile north of Brewer, Arkansas, a 40 acre private inholding within the Cherokee WMA (Area #2). The parcel is in the upper head of Sutton Hollow, approximately 1/2 (0.5) mile south of Smart Cemetery on Nelson Ridge, approximately one (1) mile east of Choppy Knob (1327 ft). Old Brewer Road North, approximately 1 mile east, is the nearest road. EOI #1770 parcel in Section 4 is a privately owned hardwood parcel surrounded by plantation loblolly pine on privately-owned timber company land also part of state WMA, Cherokee WMA (Area #2). There is a small, unnamed tributary flowing southward through the middle of this parcel. Primary use is for recreation.

EOI #1770 Sec. 23 parcel is located immediately west of and adjacent to EOI #1469. The east boundary of EOI #1770 is the west boundary of EOI#1469 (see previous above).



Figure 3-52. Aerial view of EOI #1770 - Sec 4.



Figure 3-53. Aerial broad view of EOI #1770 – Sec 4.



Figure 3-54. Aerial view of EOI #1770 – Sec 23.



Figure 3-55. Aerial broad view of EOI #1770 – Sec 23.

EOI #1773 is a single parcel totaling approximately 20 acres of privately owned surface in northwest Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel is located at

T. 11N., R. 12W., Sec. 1 W1/2NWNE – (approximately 20 acres).

EOI #1773 is located approximately one and one-half (1.5) miles southeast of Partain, Arkansas and two (2) miles northwest of Edgemont, Arkansas on the west bank of the Middle Fork of the Little Red River, Greers Ferry Lake. The parcel is located near the mouth of Stewart Hollow where it meets Greers Ferry Lake. Arkansas State Highway 16 and Davis Road are the nearest roads. EOI #1773 is adjacent to a state WMA boundary, Greers Ferry Lake WMA.



Figure 3-56. Aerial view of EOI #1773.



Figure 3-57. Aerial broad view of EOI #1773.

3.2 Visual/Noise/Recreation Resources

3.2.1 Visual Environment

The visual environment of the parcels and adjacent areas is rural and minimally developed with variable topography. The proposed lease parcels are mainly rugged, mountainous forest woodlands; many containing natural rock outcroppings or steep, rocky bluffs overlooking rivers, creeks, branches, and other smaller waterways. The surrounding areas on most parcels contain a mixture of cleared and forested areas, with minimal development except for single household dwellings, agricultural, forestry activities, and oil and gas development.

3.2.2 Noise Environment

The noise environment of the parcels and adjacent areas is consistent with a rural, forested, non-industrial environment. Elevation and topographic position of the parcels may affect sound to a greater degree than straight line distance alone would indicate. The extent to which individuals are affected by noise is controlled by several factors, including the duration and frequency of sound; the distance between the source and the receptor; the intervening natural or man-made barriers or structures; and the ambient environment. Typically, levels of noise are measured in units called decibels (dB). Because the human ear cannot perceive all pitches or frequencies equally well, noise measurements are adjusted or weighted to compensate for the human lack of sensitivity to low-pitched and high-pitched sounds. The A-weighting scale closely resembles the frequency response of the human ear and, therefore, the adjusted unit of measurement, the A-

weighted decibel, or dBA, is used to characterize noise, and to quantify the impact of noise, produced by transportation (e.g., vehicle traffic) and construction activities.

Construction equipment generates between 70 and 115 decibels (dB). Typical noise associated with oil and gas activities include the actual drilling, the pumps (that extract the oil), the engines, the compressor and the vehicle traffic to and from the site. Noise associated with oil and gas development typically continues non-stop for 30 days for each well that is constructed, but after this initial development period, the noise is expected to subside. No noise ordinance exists for rural areas of Cleburne, Stone, Van Buren, and White Counties, Arkansas.

3.2.3 Recreation Resources

Access to recreational resources at the proposed sites is limited because they are on private property. The immediate surrounding area on most proposed sites also primarily consist of private lands. Hunting is likely common on and surrounding the project area.

3.3 Socioeconomics and Environmental Justice

3.3.1 Socioeconomics

Cleburne County

Cleburne County, Arkansas consists of 553.69 square miles (U.S. Census Bureau: State and County Quick Facts, 2010). The 2015 county population was an estimated 25,467, which is a 1.9% decrease from the 2010 census. The population per square mile in 2010 was 46.9 people. The median household income in 2011 – 2015 was \$42,905.00. Cleburne County had 587 employer establishments in 2014 with 5,947 people employed (U.S. Census Bureau: State and County Quick Facts, 2015).

Stone County

Stone County, Arkansas consists of 606.41 square miles (U.S. Census Bureau: State and County Quick Facts, 2010). The 2015 county population was an estimated 12,456, which is a 0.5% increase from the 2010 census. The population per square mile in 2010 was 20.4 people. The median household income in 2011 – 2015 was \$29,264.00. Stone County had 225 employer establishments in 2014 with 1,939 people employed (U.S. Census Bureau: State and County Quick Facts, 2015).

Van Buren County

Van Buren County, Arkansas consists of 708.14 square miles (U.S. Census Bureau: State and County Quick Facts, 2010). The 2015 county population was an estimated 16,771, which is a 3.0% decrease from the 2010 census. The population per square mile in 2010 was 24.4 people. The median household income in 2011-2015 was \$32,312.00. Van Buren County had 336 employer establishments in 2014 with 3,416 people employed (U.S. Census Bureau: State and County Quick Facts, 2015).

White County

White County, Arkansas consists of 1,035.08 square miles (U.S. Census Bureau: State and County Quick Facts, 2010). The 2016 county population was an estimated 79,263, which is a 2.8 % increase from the 2010 census. The population per square mile in 2010 was 74.5 people. The median household income in 2011-2015 was \$42,554.00. White County had 1,553 employer establishments in 2015 with 22,915 people employed (U.S. Census Bureau: State and County Quick Facts, 2015).

Table 3-1. Socioeconomic data (2011-2015) for Cleburne, Stone, and Van Buren Counties, Arkansas.

County	Sq. Miles	2010	2015 Population,	Median Annual	Poverty Level (%)
		Population	Change from 2010	Income (\$)	
Cleburne	553.69	25,970	25,467, -1.9%	42,905	15.6
Stone	606.41	12,394	12,456, +0.5%	29,264	21.5
Van Buren	708.14	17,294	16,771, -3.0%	32,312	19.0
White	1,035.08	77,076	79,263, +2.8%	42,554	19.7
Arkansas (State)	52,035.48	2,915,958	2,978,204, +2.5%	41,371	19.1

(U.S. Census Bureau: State and County Quick Facts, 2010-2015).

3.3.2 Environmental Justice

EO 12898 (1994) formally requires Federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs agencies to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority or low-income populations.

Minority populations as defined by the CEQ under the 1997 Environmental Justice guidance under NEPA include individuals in the following population groups: African American, American Indian or Alaskan Native, Asian or Pacific Islander, and Hispanic. A minority population is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater..." (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). Low-income populations are determined by the U.S. Census Bureau based on poverty thresholds developed every year.

U.S. Census data is used to determine whether the populations residing in the analysis area constitute an "environmental justice population" through meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status; or
- The percentage of population that is of minority or low-income status is at least 10 percentage points higher than for the entire state of Arkansas.

Table 3-2. 2015 Population by Race (%) for Cleburne, Stone, Van Buren, and White Counties, Arkansas.

County	White	Black	Asian	American Indian	Native Hawaiian
Cleburne	96.8	0.5	0.3	0.8	Z
Stone	96.5	0.4	0.4	0.9	Z
Van Buren	96.4	0.5	0.4	0.9	Z
White	92.1	4.6	0.7	0.6	0.1
Arkansas (State)	79.5	15.7	1.6	1.0	0.3

Z Value greater than zero but less than half unit of measure shown.

(U.S. Census Bureau: State and County Quick Facts, 2010-2015).

As shown in Table 3-1, the highest poverty level occurs in Stone County (21.6%), approximately 2.4% higher than the state of Arkansas (19.1%). Also, as shown in Table 3-2, the percentages of the population in Cleburne, Stone, Van Buren, and White counties that are Black (0.4 - 4.6%), Asian (0.3 - 0.7%), American Indian (0.6 - 0.8%), and Native Hawaiian (Z - 0.1) do not occur at a 10 percent or higher level than for the state of Arkansas (Black 15.7%, Asian 1.6%, American Indian 1.0%, and Native Hawaiian 0.3%). Therefore, there do not appear to be potential environmental justice populations present in these counties.

3.4 Cultural Resources and Native American Concerns

3.4.1 Cultural Resources

A cultural resource is a broad term that refers to areas of traditional significance, use and the remains of past and current human activity. These resources may be the physical remains of a prehistoric or historic archeological site or a place of traditional cultural significance or use. A Traditional Cultural Property (TCP) refers to the connection between places on the landscape and a group's traditional beliefs, religion, or cultural practice. Because cultural resources are nonrenewable and easily damaged, laws and regulations exist to help protect them.

The NHPA, as amended, and its implementing regulations require that federal agencies consider the effects of their undertakings on "historic properties." The term "historic properties" refers to cultural properties, both prehistoric and historic, that are eligible for listing in the National Register of Historic Places (NRHP). Traditional sacred places and traditional use areas of tribes are also considered cultural historic properties that may be eligible for the NRHP, because of their association with cultural practices and beliefs rooted in history and their importance in maintaining the cultural identity of ongoing American Indian communities. Consultations about these uses and places are governed and/or mandated by the NHPA, as amended in 1992 (USC 470 et seq.), the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.) and EOs 13007, 13175, 13084, and 13647. Federal agencies consider the effects of their management activities on historic properties by first determining the area of potential effect, then conducting

literature searches and field surveys to locate cultural properties. Additionally, they consult with American Indian Tribes and other interested parties to determine whether TCPs are within the area of potential effect.

Cultural resource surveys have not been conducted on sixteen of seventeen (17) EOIs and therefore there may be undiscovered cultural resources present on or around the parcels. Literature reviews indicate these lease parcels do not have recorded historic or cultural resources and some parcels have surveys and sites within one mile. The proposed lease areas may have undiscovered sites that would qualify as historic properties (36 CFR 61). A professionally conducted survey for historic properties would add information on human utilization of this area.

3.4.2 Native American Concerns

Federally recognized Native American tribes and groups have been contacted about this proposed undertaking (see Section 1.8.2). Known sites of Native American religious activities have not been located. The area has not been surveyed for cultural resources. Religious sites or sites of cultural importance to Native Americans may be present.

3.5 Minerals and Mineral Development

The objective horizon for proposed lease parcels on the seventeen (17) EOIs listed in ES-1 is Fayetteville Shale. The commodity is natural gas.

To access federal minerals, wells would be drilled horizontally. Wells drilled in the Fayetteville Shale formation will require high-volume (HV) stimulation fracturing technology (fracking) in order to establish commercial production. Hydraulic stimulation occurs after a well has been drilled to a particular depth vertically and possibly drilled a certain distance horizontally through the targeted geologic zone (Figure 3-2). Steel pipe (casing) would be inserted in the well bore and perforated within the target zone(s) that contain oil or gas, enabling production out of the targeted zone(s) when the fracturing fluid is injected at high pressure into the well flowing through the perforations. Eventually, the targeted formation cannot absorb the fluid as quickly as it is being injected and at this point, the pressure created causes the formation to crack or fracture. Once the fractures have been created, injection ceases and some quantity of the fracturing fluids begins to flow back to the surface. Materials called proppants (e.g., usually sand or ceramic beads), which were injected as part of the fracturing fluid mixture, remain in the target formation to hold open the fractures.

Wells will require HV fracking depending on completed formation. Water use is estimated at 10,000,000 gallons per well. Sand use is estimated to be 5,000,000 pounds.

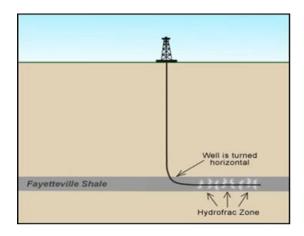


Figure 3-58. Diagram of hydraulically fracturing a well.

Some studies have shown that anywhere from 20-85% of fracturing fluids may remain underground. Used fracturing fluids that return to the surface are often referred to as flowback, and these wastes are typically stored in open pits or tanks at the well site prior to proper disposal or can be reused in developing other wells.

3.6 Wastes

The Resource Conservation and Recovery Act (RCRA) of 1976 established a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The United States Environmental Protection Agency (USEPA) regulations define solid wastes as any "discarded materials" subject to a number of exclusions. On January 6, 1988, USEPA determined that oil and gas exploration, development and production wastes would not be regulated as hazardous wastes under the RCRA. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, deals with the release (spillage, leaking dumping, accumulation, etc.), or threat of release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA exempt contaminants could be subject to regulations as a hazardous substance under CERCLA.

During the site visits, no hazardous or solid waste disposal sites were located on the proposed lease parcels. Should the parcels be leased and the federal minerals developed, generation and temporary storage of waste materials (solid and liquid) would likely occur near the lease parcels.

3.7 Soils

Table 3-3 lists soils, soil series descriptions, and percentage of occurrence documented to occur by Soil Survey Staff (NRCS 2017) on the seventeen (17) EOIs located in Cleburne, Stone, Van Buren, and White Counties.

Table 3-3. Soil Series list for EOI #s found in Table ES-1.

EOI#	State and County	Soil Series (major)
EOI 630	AR, Van Buren County	StMtn, 43%, StNMtn 36%, KC 17%, StL 4%

EOI#	State and County	Soil Series (major)
		Sect 2 – L 95%, StMtn 4%
		Sect 8 (center) – StMtn 99%
		Sect 8 (NE) – StMtn 100%
EOI 726	AR, Cleburne County	Sect 9 – StMtn 99%
LO1 720	711, Cleburic County	Sect 10 – StMtn 100%
		Sect 15 – StMtn 99%
		Sect 17 – StMtn 99%
		Sect 35 – ENSt 89%, StMtn 9%
		Sect 9 - StMtnR 60%, KC 15%, StL 7%, ENSt 6%, StMtn 6%,
EOI 728	AR, Cleburne County	StNMtn 6%
		Sect 15 – StMtnR 60%, StMtn 26%, KC 7%, StNMtn 4%, LMtn 3%
EOI 730	AR, Cleburne County	StMtnR 50%, StMtn 26%, Est 23%
EOI 733	AR, Van Buren County	StNMtn 61%, StMtn 28%, KC 6%
EOI 737	AR, Van Buren County	StL 96%, StMtn 4%
		Sect 1 – ESt 76%, StMtnR 24%
		Sect 2 – E 50%, ESt 42%, StMtn 8%
EOI 738	AR, Van Buren County	Sect 4 – StMtnR 52%, ESt 22%, KC 20%
LO1 730		Sect 6 – StMtnR 50%, ESt 46%
		Sect 18 – StMtnR 60%, ESt 33%, ENSt 4%
		Sect 31 – ESt 56%, StMtnR 30%, E 8%
	AR, Van Buren County	Sect 1 – ESt 78%, StMtn 14%, StMtnR 9%
		Sect 13 – StMtnR 63%, ESt 37%
		Sect 20 – ESt 60%, StMtn 39%
EOI 739		Sect 23 – StMtn 52%, StMtnR 45%
		Sect 24 – StMtn 52%, StMtnR 46%
		Sect 26 – ESt 100%
		Sect 29 – StMtn 46%, StMtnR 21%, ENSt 17%, KC 13%
EOI 743	AR, Van Buren County	Sect 15 – ESt 52%, StMtnR 31%, StL 7%
TOY 0 (41	•	Sect 26 – 92% ESt
EOI 961b	AR, White County	Large Water 89%, Nugent loamy fine sand 10%
EOI 1086	AR, Cleburne County	StNMtn 34%, StMtnR 26%, StMtn 24%, StL 13%
EOI 1103	AR, Stone County	NE 61%, Estate-Portia-Moko 27%, Moko-Estate 10%
EOI 1148	AR, Cleburne County	StMtnR 56%, ESt 44%
EOI 1174	AR, Van Buren County	StMtnR 99%
EOI 1469	AR, Cleburne County	StMtnR 46%, ESt 41%, StMtn 14%
EOI 1770	AR, Cleburne County	Sect 4 – StMtnR 41%, StNMtn 37%, StMtn 12%, ESt 11%
	,	Sect 23 – ESt 95%, StMtnR 3%
EOI 1773	AR, Cleburne County	StMtnR 69%, LMtn 22%

Note: StMtnR – Steprock Mountainburg Rock Outcrop

StMtn – Steprock Mountainburg Complex

StNMtn – Steprock Nella Mountainburg Complex

StL – Steprock Linker complex

N – Nella series

E – *Enders series*

ESt or ENSt – Enders Steprock or Enders Nella Steprock complex

L – Linker gravelly fine sandy loam

LMtn – Linker Mountainburg complex

KC – Kenn Ceda complex

Steprock-Mountainburg-Rock Outcrop (40-60% slope) Complex (StMtnR)

Mountainburg soils are shallow, well-drained, fine sandy loams typically found on the upper parts of hills, ledges, adjacent benches, and ridgetops of varying slope (1-65%). Parent material

is gravelly and stony, loamy residuum weathered from sandstone. It is a well-drained soil with a very low available water capacity. Steprock soils are moderately deep, well-drained, loamy soils found on sideslopes of 3-60%. Parent materials are residuum and colluvium weathered from shale, sandstone, and siltstone. It is a well-drained soil with a low available water capacity. Major uses are forest, pasture, and limited row crops. Natural woodland vegetation for both soils consists of upland oaks - blackjack oak (*Q. marilandica*), post oak (*Q. stellata*), northern red oak (*Q. rubra*), southern red oak (*Q. falcata*), and white oak (*Q. alba*), various hickory (*Carya*) species, blackgum (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), and shortleaf pine. Major uses are woodland and pasture with limited row-cropping use.

Steprock-Mountainburg complex (3-20% slope) (StMtn)

This complex consists of moderately deep, well-drained, moderately sloping to moderately steep slope soils (see above) without the rocky outcrop.

Steprock-Nella-Mountainburg complex (20-40% slope) (StNMtn)

This complex consists of the soils named above with the addition of Nella. This complex consists of well-drained, deep to shallow, steep, loamy, and stony soils. Nella soils are deep soils with moderate available water capacity commonly found on colluvial or backslope positions on hillsides, mountaintops, and toe slopes. Its parent material is loamy colluvium derived from sandstone and shale. Nella soils include yellow poplar (*Liriodendron tulipifera*), American beech (*Fagus grandifolia*), and Virginia pine to the list of natural woodland vegetation found in the Steprock-Mountainburg association.

Enders-Steprock (8-40% slope) (ESt) or Enders-Nella-Steprock (8-20% slope) (ENSt) complex Steprock and Nella (see above). Enders is a deep, well-drained gravelly, fine sandy loam soil, commonly found on the backslope of hills on nearly level to moderately steep upland mountaintop and ridges, sideslopes, and footslopes. Its parent material is loamy colluvium and clayey residuum weathered from acid shale and sandstone. It is a well-drained soil with a moderate available water capacity. The majority of this soil is in forest but some is cropped to cotton, corn, and small grains. Native vegetation was upland oaks (red, white, post), hickory, and shortleaf pine.

Linker gravelly fine sandy loam (3-12% slope) (L)

Linker soil is moderately deep, well-drained, loamy residuum derived from sandstone. It is generally found on the lower part of hillsides. The permeability is moderate and the available water content is low. Major uses are woodland, pasture, and poultry operations. Natural woodland vegetation consists of upland oaks (red, post, blackjack), hickory, blackgum, sweetgum, and shortleaf pine.

Kenn-Ceda complex (KC)

The complex consists of well-drained, deep, level soils on flooded plains. This complex is of minor distribution; found only in flood plains of the Ouachita and Boston Mountains and Arkansas Valley of Arkansas and Oklahoma and Cumberland Plateau and Mountain of Alabama. Kenn soil is usually higher on the flood plain than Ceda soil. The available water table for both soils is low, and Kenn soil is strongly acid or very strongly acid throughout while Ceda soil is slightly acid or medium acid throughout. Kenn soil parent material is loamy alluvium derived

from sandstone and shale while Ceda soil parent material is gravelly alluvium derived from sandstone and shale. The complex is composed of about 50 percent Kenn soil, 30 percent Ceda soil, and 20 percent other soils. Natural woodland vegetation for both soils consists of oaks (southern red, post, and white), sycamore (*Platanus occidentalis*), sweetgum, and shortleaf pine. Major uses are woodland and native pasture.

Nugent Loamy Sand (0-2% slope)

The Nugent series consists of deep, excessively drained soils formed in sandy alluvium that encompasses a thin layer of finer textured material. These soils are found on natural levees of stream floodplains that drain uplands of the Southern Coastal Plain. Slopes are 0-2 percent or nearly level. Most areas of Nugent soils are used for woodland. Vegetation is mixed hardwoods and pine trees. Common trees are water oak (*Quercus nigra*), sweetgum, willow oak (*Quercus phellos*), slash pine (*Pinus elliottii*), and loblolly pine. Some areas are cleared and used for growing pasture and corn.

3.8 Air Resources

3.8.1 Air Quality

In the general area of the parcel, the primary sources of air pollution are dust from blowing wind on disturbed or exposed soil, exhaust emissions from motorized equipment, oil and gas development, agriculture, and industrial sources. The USEPA was given the authority for air quality protection with the provision to delegate this authority to the state as appropriate under United States law. The Arkansas Department for Environmental Quality (ADEQ) has been delegated the authority for air quality protection in Arkansas. The Clean Air Act of 1970, as amended, requires the establishment of National Ambient Air Quality Standards (NAAQS). NAAQS pollutants include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), sulfur dioxide (SO₂), and lead (Pb). The NAAQS pollutants are monitored in Arkansas by the ADEQ. The Clean Air Act identifies two types of NAAQS. Primary standards define levels of air quality that the USEPA judges to be necessary, with an adequate margin of safety, to protect the public health. Secondary standards define levels of air quality that the USEPA judges to be necessary to protect the public from any known or anticipated adverse effects of a pollutant. Both primary and secondary standards are currently in effect (Table 3-2).

Table 3-4. National Ambient Air Quality Standards.

	Primary Stand	ards		Secondary Standards		
Pollutant	Level		Averaging Time	Level	Averaging Time	
<u>Carbon</u>	9	ppm	8-hour (1)	None		
<u>Monoxide</u>	(10 mg/m^3)					
	35	ppm	1-hour (1)			
	(40 mg/m^3)					
Lead	0.15 μg/m ³ (2)		Rolling 3-Month Average	Same as Primary		
	$1.5 \mu g/m^3$		Quarterly Average	Same as Primary		
Nitrogen_	53 ppb (3)		Annual	Same as Primary		
<u>Dioxide</u>			(Arithmetic Average)			
	100 ppb		1-hour (4)	None		

	Primary Standards		Secondary Standards	
Pollutant	Level	Averaging Time	Level	Averaging Time
Particulate Matter (PM ₁₀)	$150 \mu\text{g/m}^3$	24-hour (5)	Same as Primary	
Particulate Matter (PM _{2.5}) 15.0 μg/m ³		Annual (6) (Arithmetic Average)	Same as Primary	
	$35 \mu g/m^3$	24-hour (7)	Same as Primary	
<u>Ozone</u>	0.075 ppm (2008 std)	8-hour (8)	Same as Primary	
	0.08 ppm (1997 std)	8-hour (9)	Same as Primary	
	0.12 ppm	1-hour (10)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5	3-hour (1)
	0.14 ppm	24-hour (1)	0.5 ppm	3-Hour

Note:

- (1) Not to be exceeded more than once per year.
- (2) Final rule signed October 15, 2008.
- (3) The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
- (4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).
- (5) Not to be exceeded more than once per year on average over 3 years.
- (6) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 μg/m3.
- (7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 μg/m3 (effective December 17, 2006).
- (8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008).
- (9) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm. (b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes
 - rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard. (c) USEPA is in the process of reconsidering these standards (set in March 2008).
- (10) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
 - (b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.

Air quality in a given region can be measured by its Air Quality Index (AQI) value. The AQI is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. The AQI is a national index and the air quality rating is an important indicator for populations sensitive to air quality changes. The closest air monitoring station to the parcel is located in North Little Rock, Arkansas. On March 16, 2017, the AQI in North Little Rock was 30 with an acceptable concentration of 7.2 for particulate matter (PM_{2.5}) (AirNow 2017).

3.8.1.1 Visibility

Visibility, also referred to as visual range, is a subjective measure of the distance that light or an object can clearly be seen by an observer. Light extinction is used as a measure of visibility and is calculated from the monitored components of fine particle mass (aerosols) and relative humidity. It is estimated that the average natural background visibility range for the eastern U. S. varies from 65 to 121 miles. Visibility range information is not available for Arkansas.

There are three classifications of areas that attain NAAQS: Class I, Class II, and Class III. Congress established certain national parks and wilderness areas as mandatory Class I areas where only a small amount of air quality degradation is allowed. Since 1980, the Interagency Monitoring of Protected Visual Environments network has measured visibility in Class I areas. These are managed as high visual quality under the federal visual resource management program. The Clean Air Act 1997 amendment declared "as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas...from manmade air pollution" 42 USC Section 7491(a)(1).25. All other areas of the United States are designated as Class II, which allow a moderate amount of air quality degradation. No areas of the United States have been designated Class III, which would allow more air quality degradation. The Clean Air Act gives federal managers the affirmative responsibility, but no regulatory authority, to protect air quality-related values, including visibility, from degradation.

There are two (2) Class I areas in Arkansas: Upper Buffalo and Caney Creek Wilderness areas. The Upper Buffalo Wilderness Area is part of the Ozark-St. Francis National Forest and located in western Newton County, Arkansas. Caney Creek Wilderness Area is part of the Ouachita National Forest and located in Polk County, Arkansas. Under authority of the Wilderness Act of 1964, Congress established the Upper Buffalo Wilderness Area and Caney Creek Wilderness Area in 1975 (P.L. 93-622). These Wilderness Areas were designated as Class I areas by Congress in August, 1977 (UFWS 2015). The eastern side of Upper Buffalo Wilderness Area is ~ 45 miles west-northwest from the nearest EOIs - EOI #739 and 743 in Van Buren County (and ~ 90 miles from the most distant EOI - EOI #726 in Cleburne County. Caney Creek Wilderness Area is ~ 116 miles southwest of the nearest EOI - EOI #630 in Van Buren County (and ~ 156 miles southwest of the most distant EOI - EOI #726 in Cleburne County). There are no Class I areas near the proposed lease parcels.

Prevention of Significant Deterioration (PSD) increments limit air quality degradation and ensure that areas with clean air continue to meet NAAQS, even during economic development. The PSD program goal is to maintain pristine air quality required to protect public health and welfare from air pollution effects and "to preserve, protect and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreation, scenic or historic value." PSD increments have been established for NO₂, SO₂, and PM₁₀. Comparisons of potential PM₁₀, NO₂, and SO₂ concentrations with PSD increments are intended only to evaluate a threshold of concern. The allowable PSD increment depends on an area's classification. Class I areas have lower increments, due to their protected status as pristine areas. PSD increment data is currently unavailable for Arkansas.

3.8.2 Climate and Climate Change

3.8.2.1 Local Climate

Arkansas has a humid, sub-tropical climate influenced by prairie to the west and the Gulf of Mexico to the south – the primary weather influence in the state (Encyclopedia of Arkansas, 2017). Arkansas additionally has a significant altitudinal contrast between its southern and eastern flat plain and northern and western mountainous regions. The disparity in landscape and altitude coupled with the interaction of cool, dry air from the Rocky Mountains across the prairie meeting moist, warm air from the Gulf of Mexico can cause severe weather extremes, especially in the spring and fall (Encyclopedia of Arkansas, 2017). Tornadoes can develop any time of the year, but the primary season is from March to May. Their occurrence is most common in April. A second tornado season takes place from November to January. Intense, localized thunderstorms and rainfall is often associated with these storms (NetState 2016).

Arkansas climate is characterized by long, wet, warm summers and short, mild, slightly drier winters. Summer temperatures average 90° degrees Fahrenheit (°F) in the center of the state. The statewide annual average precipitation varies between forty (40) and sixty (60) inches (Encyclopedia of Arkansas, 2017). Prevalent winds from the south/southeast bring warm, moist air from the Gulf, resulting in abundant rainfall. This happens often in winter, causing freezing rain. Winters are generally mild, although they can be harsh for short periods. Average winter temperatures are near 50°. Minor ice accumulations happen somewhere in the state annually with major ice storms occurring every five to ten years (Encyclopedia of Arkansas, 2017).

3.8.2.2 Global Climate

Scientific research shows that global climate is influenced by many factors including natural processes (i.e., changes in the sun's intensity or changes in ocean circulation) and human activities (such as burning fossil fuels and increased urbanization) (Intergovernmental Panel on Climate Change [IPCC] 2013). History shows that in the past, the earth has gone through a number of ice ages with periods of warming and droughts between periods. The most recent Ice Age ended around 13,000 years ago and the climate has warmed and dried since then. The warming and drying has not been continuous. However, the rate at which atmospheric CO₂ concentrations has risen in the past years appears to correspond with observed temperature changes.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies 2007). In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2008) has confirmed these findings, but also indicated that there are uncertainties regarding how changes in climate may affect different regions.

Ongoing scientific research is studying the potential effects of certain types of pollutants on global climate, particularly those that are "greenhouse gases (GHG)" (composed of carbon dioxide, CO₂; methane, CH₄; nitrous oxide, N₂O; water vapor; and several trace gasses).

Through complex interactions on a regional and global scale, scientific research shows that these pollutants cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space.

Some GHGs such as CO₂ occur naturally and emit into the atmosphere through natural processes and human activities. Human activities create and emit other GHGs (e.g., fluorinated gases). The primary GHGs that enter the atmosphere as a result of anthropogenic activities include CO₂, CH₄, N₂O, and fluorinated gases such as hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF). Fluorinated gases are powerful GHGs that emit from a variety of industrial processes including production of refrigeration/cooling systems, foams and aerosols; however, fluorinated gases are not primary to the activities authorized by the BLM.

Although research shows a relationship between GHG and temperature, the variety of scientific tools designed to predict changes in local or global climate limits the ability to definitively identify potential future impacts on climate. Currently, the ADEQ does not have regulations regarding GHG emissions.

3.9 Water Resources - Surface/Ground Water

The Arkansas Oil & Gas Commission (AOGC) regulates oil and gas operations in the state of Arkansas. The AOGC has the responsibility to gather oil and gas production data, permit new wells, establish pool rules and oil and gas allowables, issue discharge permits, enforce rules and regulations of the division, monitor underground injection wells, and ensure that abandoned wells are properly plugged and the land is responsibly restored. The ADEQ administers major environmental protection laws. The ADEQ administers all Water Quality Act regulations pertaining to surface and groundwater (except sewage not present in a combined waste stream). According to the ADEQ, produced water if predictable in salt concentration, can be used for drilling and completion and possibly cementing.

3.9.1 Surface Water

Surface water hydrology within the area is typically influenced by geology, soil characteristics, precipitation and vegetation. Sixteen (16) of the seventeen (17) EOIs considered have surface water (in the form of rivers, creeks, branches etc.) present on the proposed lease parcels (see Table 3-5).

Table 3-5. Surface Water presence on Arkansas EOIs

State	File	Acres	State and	Legal Description	Surface Water
	#		County		
AR	EOI 630	107.5	AR, Van Buren County	AR, Van Buren County, Fifth Principal Meridian, T10N, R14W, SEC. 34, NE SW; E2 SE SW; SW SE; Part of the NW SE described NWSE southwest corner run north 190 yards, east 190 yards south 190 yards west 190 yards to point of beginning 7.5 acres more ore less and total 107.5 acres (190 yards = 570 feet)	Choctaw Creek
	EOI 726	453.2	AR, Cleburne County	AR, Cleburne County, 5th Principal Meridian, T12N, R8W, Sec. 2, Fractional NW	Five Branch, Wolf Bayou, Little Bayou, Iron

				Spring
EOI 728	325	AR, Cleburne County	AR, Cleburne County, Fifth Principal Meridian, T12N, R10W, Sec. 9, N2NW SESW, N2N2 SWSW, NWSW, Sec. 15, NWSW, SESW, SWSE	Panther Skin Creek, Clifty Creek
EOI 730	40	AR, Cleburne County	AR, Cleburne County, Fifth Principal, T12N, R12W, Sec. 23, NESE	Wild Goose Creek
EOI 733	65	AR, Van Buren County	AR, Van Buren County, Fifth Prinicpal Meridian, T9N, R12W, Sec. 21, Metes and Bounds (see map for description)	North Fork Cadron Creek
EOI 737	10.63	AR, Van Buren County	AR, Van Buren County, Fifth Principal Meridian, T11N, R12W, Sec. 33, Part of the SWNW	NA
EOI 738	765.33	AR, Van Buren County	AR, Van Buren County, Fifth Principal Meridian, T11N, R14W, Sec. 1, SWNW, Sec. 2, NENW, Sec. 4, W2SE, Sec. 6, S2N2, NWNE, N2NW, W2SW, Sec. 18, W2NW, NESW, Sec. 31, E2NW, SWNE	Hurricane Branch, Archey Creek, Bradley Branch
EOI 739	507.5	AR, Van Buren County	AR, Van Buren County, Fifth Principal, T11N, R15W, Sec. 13, NENE, Sec. 20, SENW, S2SWNW, S2NWSWNW, NWNWSWNW, Sec. 23, SWSE, Sec. 24, NWNE, Sec. 26, S2NW, Sec. 29, SESW, S2SE	Hurricane Branch, South Fork Little Red River
EOI 743	120	AR, Van Buren County	AR, Van Buren County, Fifth Principal T12N, R15W, Sec. 15, W2NE, Sec. 26, NWNW	Archey Creek
EOI 961b	11.9	AR, White County	AR, White County, Fifth Principal Meridian, T9N, R7W, Sec. 26, W2SE (Portion lying in Riverbed)	Little Red River
EOI 1086	80	AR, Cleburne County	AR, Cleburne County, Fifth Principal Meridian, T9N, R11W, Sec. 6, N2NE	Intermittent, unnamed tributary draining into Ward Creek
EOI 1103	80	AR, Stone County	AR, Stone County, T13N, R12W, Sec. 36, S2SE	Wild Goose Creek
EOI 1148	40	AR, Cleburne County	AR, Cleburne County, 5th Principal Meridian, T12N, R11W, Sec. 36, SESE	Unnamed tributary draining Wildcat Hollow
EOI 1174	20	AR, Van Buren County	AR, Van Buren County, 5th Principal Meridian, T12N, R14W, Sec. 20, W2E2E2SE	Unnamed tributary draining Collins Hollow
EOI 1469	40	AR, Cleburne County	AR, Cleburne County, T21N, R11W, Sec. 24, SWSW	Unnamed tributary draining into Sugar Camp Creek
EOI 1770	80	AR, Cleburne County	AR, Cleburne County, 5th Principal Meridian, T12N, R11W, Sec, 4, SESW, and Sec. 23, SESE	Unnamed tributary draining Sutton Hollow into Hill Creek
EOI 1773	20	AR, Cleburne County	AR, Cleburne County, 5th Principal Meridian, T11N, R12W, Sec, 1, W2NWNE	Unnamed tributary draining Stewart Hollow

Greers Ferry Lake is the nearest large body of surface water to many of these EOIs. It is a 31,500 acre flood control and hydroelectric-generating reservoir with over 300 miles of shoreline

located in Cleburne and Van Buren Counties. The North, Middle, and South Forks of the Little Red River including associated smaller tributaries that feed and drain Greers Ferry Lake are also nearby surface water for EOIs present in Cleburne, Van Buren, and White Counties.

Water resources may be affected by many activities including fire/prescribed burns, military use, mineral extraction, recreation, transportation, and vegetation management activities. The most likely effects to hydrology will be to stream channel morphology, and water quality. Channel alterations can be measured in specific morphological parameters. Water nutrients can be measured in concentration per unit volume.

The Arkansas River Valley Region exhibits distinct seasonal characteristics of its surface waters with zero flows common during summer critical conditions (Encyclopedia of Arkansas, 2017). Peak runoff events from within this region tend to introduce contaminants from the predominantly agricultural land use, which are primarily pasture lands with increasing poultry production. The development of natural gas has resulted in some site-specific water quality degradation. Soil types in much of this area are highly erosive and tend to easily go into colloidal suspension, thus causing long-lasting, high turbidity values (ADEQ 2008).

3.9.2 Groundwater Resources

Arkansas has a total of sixteen aquifers divided between two major physiographic regions of the state: the Coastal Plain Province of eastern and southern Arkansas which contains 11 aquifers and the Interior Highlands Division of western Arkansas which contains the remaining 5 aquifers. The proposed EOIs in Cleburne, Stone, Van Buren, and White Counties in north-central Arkansas fall into two lesser physiographic regions of the Interior Highlands Division: Arkansas River Valley and the Boston Mountains sub-region of the Ozark Plateau.

The Arkansas River Valley region is supplied by the Arkansas River Valley aquifer. It is the youngest of the Interior Highland aquifers and lies between the Boston Mountains to the north and the Ouachita Mountains to the south (Kresse, et al. USGS, 2014). Alluvial deposits containing interbedded clay, gravel, and sand in varying thicknesses and coverage along the Arkansas River are one of the most important sources of water in the Arkansas River Valley region (Encyclopedia of Arkansas, 2017). Primary use is for irrigation and public supply. As of 2013, only the cities of Dardanelle and Maumelle were using the Arkansas River Valley alluvial aquifer as a sole source of public-supply water (Kresse, et al., USGS, 2014). In the past, more cities used this aquifer for water needs.

The Boston Mountains sub-region of the Ozark Plateau region is supplied by the Western Interior Plains Confining System aquifer (Kresse, et al. USGS, 2014). It is a thick sequence of poorly permeable Pennsylvanian and Upper Mississippian age shale and sandstone rocks underlying the Boston Mountains (Encyclopedia of Arkansas, 2017). Shallow (< 300 feet) wells supply water needs in this area due to the low-permeability and confining nature of dominant shale formations. Low well recharge rates and water yield rates are common (many wells go dry during pumping; especially during drought periods) resulting in domestic supply as the dominant use, with minor use for industrial, public, and commercial purposes (Kresse, et al. USGS, 2014). Surface water is the primary use for meeting industry and population growth needs.

Groundwater hydrology within the areas is influenced by geology and recharge rates. Groundwater quality and quantity can be influenced by precipitation, water supply wells, and various disposal activities (Kresse, et al. USGS, 2014). Most onshore produced water is injected deep underground for either enhanced recovery or disposal. With the passage of the Safe Drinking Water Act in 1974, the subsurface injection of fluids came under federal regulation. In 1980, the USEPA promulgated the Underground Injection Control regulations. The program is designed to protect underground sources of drinking water.

Areas of poor water quality can result from both natural and anthropogenic sources. Natural sources of contamination are typically regional in extent and are related to water-rock interactions. Anthropogenic impacts include both point and nonpoint sources of contamination. Nonpoint sources can result in large areas of impact, although contaminant concentrations typically are significantly lower than point sources, and the contaminants typically represent soluble, non-reactive species. Point sources of contamination often result in elevated levels of contaminants that exceed federal maximum contaminant levels; however, the extent of contamination normally is confined to a small area, with little to no offsite migration or impact on receptors (ADEQ 2008).

3.10 Wetlands/Riparian Areas/Floodplains

Wetland habitats provide important wintering and migration habitat for several species of migratory birds. Wetlands also provide a link between land and water and are some of the most productive ecosystems in the world. EO 11990 on the Protection of Wetlands provides an opportunity for early review of federal agency plans regarding new construction in wetland areas. Under EO 11990, each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

Wetland / riparian zones in the proposed lease areas occur in a variety of scale due to differing sizes of waterways present and the varying topography and slope of the landscape. Accordingly, wetland/riparian zones in the proposed lease areas are extremely narrow, often lengthy and frequently intermittent given the nature of the small rivulets, rills, branches, and creeks that occur in north-central Arkansas. Floodplains are often measured in inches or feet. Waterways can be as narrow as a few inches or as broad as the South Fork of the Little Red River. The Arkansas River, the largest in the state ~ 30 miles to the south of the lease areas, only has a floodplain of ~ 40 miles at the widest point between the Ozark and Ouachita mountains. With over 300 miles of shoreline, Greers Ferry Lake provides the nearest large wetland /riparian area to the proposed lease areas.

3.11 Invasive/Exotic Species

Noxious weeds can have a disastrous impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. Noxious weeds cause \$2 to \$3 million in estimated losses to producers annually. These losses are attributed to: 1) decreased quality of agricultural products due to high levels of

competition from noxious weeds, 2) decreased quantity of agricultural products due to noxious weed infestations, and 3) costs to control and/or prevent the spread of noxious weeds.

There are a number of non-native species that are considered invasive in Arkansas. The Pocket Field Guide, taken from Invasive Insects, Plants, and Pathogens of Concern in Arkansas (Arkansas Agriculture Department 2017) lists Invasive Plants of Concern in Arkansas and is summarized in Table 3-6 below. The potential applicability of these invasive species' habitat to the proposed tract is also discussed below. Site reconnaissance visits revealed three observed invasive species on 5 EOIs – EOI #630 (Chinese privet *Ligustrum sinense*), EOI #726 (Chinese privet), EOI #733 (Chinese privet), EOI #738 (Sericea lespedeza *Lespedeza cuneata*, Paulownia or Princesstree *Paulownia tomentosa*, Autumn olive *Eleagnus umbellata*), EOI #739 (Sericea lespedeza), and EOI 1086 (Chinese privet).

Table 3-6. Invasive Plants of Concern in Arkansas (taken from Invasive Insects, Plants, and Pathogens of Concern in Arkansas – Pocket Field Guide).

COMMON NAME	SCIENTIFIC NAME	HABITAT SUITABILITY ON PARCELS		
Cogongrass	Imperatica cylindrical	No suitable habitat on parcels		
Chinese Privet	Ligustrum sinense	Suitable habitat on parcels		
Water Hyacinth	Eichornia crassipes	No suitable water on parcels		
Purple Loosestrife	Lythrum salicaria	Suitable habitat on parcels		
Giant Salvinia	Salvinia molesta	No suitable water on parcels		
Tropical Soda Apple	Solanum viaria	No suitable habitat on parcels		
Bradford Pear	Pyrus calleryana	Suitable habitat on parcels		
Chinaberry	Melia azedarach	Suitable habitat on parcels		
Paulownia tree	Paulownia tometosa	Suitable habitat on parcels		
Tree of Heaven	Ailanthus altissima	Suitable habitat on parcels		
Kudzu	Pueraria montana	Suitable habitat on parcels		
Lespedeza	Lespedeza cuneata	Suitable habitat on parcels		

3.12 Vegetation and Wildlife

3.12.1 Vegetation

EOI #630

EOI #630 (Figures 1-1, 3-2, and 3-3) consists of one (1) parcel of 107.5 acres privately owned surface located in north-central Arkansas (Van Buren County), part of the Arkansas River Valley physiographic region.

EOI #630 is a forested, primarily hardwood drainage along Choctaw Creek. A reconnaissance site visit on June 13, 2017 with the landowner revealed dominant tree species were shortleaf pine, various oak and hickory species: northern red oak, southern red oak, blackjack oak, white oak, post oak, mockernut hickory (*C. tomentosa*), red hickory (*C. glabra*), and shellbark (*C. laciniosa*). Other dominant tree species include: sycamore, black cherry (*Prunus serotina*), white ash (*Fraxinus americana*), red maple (*Acer rubrum*), blackgum, sweetgum, eastern red

cedar (Juniperus virginiana), honey locust (Gleditsia triacanthos), and persimmon (Diospyros virginiana).

The forested area of this parcel is of intermediate maturity (approximately 25-40 years) with the more mature trees (approximately 60 years+, 75-90 ft in height) located along old fencelines of former pastureland, around barns / old homeplaces of which two were observed, and small, individual woodlots. The relatively even-age of younger forest stands and remnant stumps indicated one or more previous timber harvest activities approximately 20-40 years previous and was confirmed by the landowner. As a result, the under and midstory was relatively thick with both pine and hardwood regeneration making access difficult.

Observed understory and midstory species include sassafras (Sassafras albidum), deerberry (Vaccinium elliotti), tree sparkleberry (Vaccinium arboreum), pawpaw (Asimina triloba), beaked hazelnut (Corylus cornuta), Carolina buckthorn (Rhamnus caroliniana), American beech, Eastern hophornbeam (Ostrya virginiana) American elm (Ulmus americana), winged elm (Ulmus alata), poison ivy (Toxicodendron radicans), pinebarren ticktrefoil (Desmodium strictum), winged sumac (Rhus copallinum), blackberry (Rubus argutus), trailing lespedeza (Lespedeza procumbens), downy milkpea (Galactia volubilis), spurred butterfly pea (Centrosema virginianum), black-eyed Susan (Rudbeckia hirta), variable panicgrass (Dicanthelium commutatum), broomsedge bluestem (Andropogon virginicus), southern lady fern (Athyrium filix-femina), various greenbrier (Smilax spp.), muscadine grape (Vitis rotundifolia), and yucca (Yucca filamentosa).

EOI #726

EOI #726 (Figures 1-2 to 1-4, 3-4 to 3-9) consists of seven (7) parcels totaling approximately 453.2 acres of privately owned surface, all located in the northeastern corner of Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region.

Mature hardwood stands were observed on one of the two parcels in Section 8 and the parcel in Section 17. Hardwood cutovers of varying ages and sizes existed in observed parcels in Section 8, 15, and 35. Dominant tree species were similar for all tracts visited and consisted of shortleaf pine, various oak and hickory species, and other hardwood species including white oak, northern red oak, post oak, chestnut oak (*Q. montana*), red maple, blackgum, sweetgum, and white ash.

Observed understory and midstory species include flowering dogwood (*Cornus florida*), winged elm, red buckeye (*Aesculus pavia*), muscadine grape, redbud (*Cersis canadensis*), sweetgum, American elm, American beech, red mulberry (*Morus rubra*), sweet violet (*Viola blanda*), southern lady fern, possumhaw (*Viburnum nudum*), black cherry, ebony spleenwort (*Asplenium platyneuron*), Virginia creeper (*Parthenocissus quinquefolia*), poison ivy, eastern red cedar, blackberry, spurred butterfly pea, wild strawberry (*Fragaria virginiana*), red chokeberry (*Aronia arbutifolia*), devil's walkingstick (*Aralia spinosa*), strawberry bush (*Euonymus americana*), Christmas fern (*Polystichum acrostichoides*), deerberry, and sassafras.

Section 2 (Figures 1-2, 3-4, 3-5) is 13.2 acres of mixed pine-hardwood forest in northeastern Cleburne County on the border of Independence County. The eastern end of the east-west rectangle shaped parcel encompasses the upper end of Womack Spring Hollow. Site visit

permission for this parcel was not obtained. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), and USGS topographic quadrangle 1:24,000 maps. Due to the proximity to other nearby parcels in EOI #726, plant and animal species are expected to be similar to those found in the surrounding Cleburne County area.

Section 8 (Figures 1-3, 3-6, 3-7) is 80 acres in two separate 40 acre blocks of forested land. A reconnaissance site visit occurred on April 27, 2017. The northern 40 spans Still Hollow in the north-eastern corner of Section 8 with one dwelling located in the southeast corner. There is one hardwood drainage running east-west in Still Hollow and another drainage running north-south on the west boundary. The primarily hardwood forest has a fragmented, discontinuous forest canopy due to a mix of partial cutover (10-15 year old, 15-30 feet high) with some mature shortleaf pine-hardwood occupying the lower drainage slopes. As a result the mid-story was extremely dense with vines and hardwood regeneration leaving the understory to be primarily composed of leaf litter and woody debris. The other 40 acres is within a 1/4 mile but south and slightly west. This forest is a mature (50+ years), well-stocked (80 basal area (BA)) stand of large (16 - 26 inch diameter-at-breast-height (dbh)), mixed shortleaf pine-hardwoods approximately 75-85' tall with a continuous, dominant overstory canopy. As a result, the midstory was relatively open and the understory supported a diversity of shade-tolerant ground species. There is one hardwood drainage running northwest-east central through the parcel with mature stands of mixed shortleaf pine-hardwood occupying the northeast corner and southern portion of the parcel. Steep slopes and rock outcroppings are prevalent leading down to the drainage.

Section 9 (Figures 1-3, 3-6, 3-7) is a linear north-south rectangle of 120 forested acres bisected by Little Bayou along the eastern part of Section 9 at the mouth of Spring Hollow. The forested parcel appears to be a combination of older and younger age-class shortleaf pine-hardwood forest. Site visit permission for this parcel was not obtained. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), USGS topographic quadrangle 1:24,000 maps, and neighboring landowners. Due to the proximity to other nearby parcels in EOI #726, plant and animal species are expected to be similar to those found in the surrounding Cleburne County area. This parcel is within the karst region located in northern Arkansas.

Section 10 (Figures 1-3, 3-6, 3-7) is a 40 acre forested parcel located on the western side of Section 10 and adjacent to the southeastern side of the Section 9 parcel above. Little Bayou runs through the western portion of the parcel. Mixed shortleaf pine-hardwood forest are represented on this parcel. Site visit permission for this parcel was not obtained. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), USGS topographic quadrangle 1:24,000 maps, and neighboring landowners. Due to the proximity to other nearby parcels in EOI #726, plant and animal species are expected to be similar to those found in the surrounding Cleburne County area. This parcel is within the karst region located in northern Arkansas.

Section 15 (Figures 1-3, 3-6, 3-7) is a 40 acre forested parcel located in the northwestern corner of Section 15. A reconnaissance site visit occurred on June 15, 2017. Iron Spring Hollow

transects the northwest corner. An unnamed east-west tributary that drains into Iron Spring Hollow also transects the southern half of this parcel. Hardwood cutover (10-15 years) dominates the majority of this parcel. Mature shortleaf pine-hardwood forest occurs on lower drainage or steep slopes. Rock outcroppings are prevalent on upper drainage slopes. The midstory is extremely dense with hardwood regeneration and the resulting understory is composed primarily of hardwood leaf litter, rock, and woody debris. The landowner, a former owner of some of the parcels located in Sections 9 and 10, reported the presence of possible karst formations on the Section 9 and 10 parcels.

Section 17 (Figures 1-3, 3-6, 3-7) is a 120 acre parcel of mature forest located in the northwestern corner of Section 17. A reconnaissance site visit occurred on April 27, 2017. Five Branch, a waterway that drains into Wolf Bayou, transects the parcel from north-southeast. Large, mature shortleaf pine-mixed hardwoods form a continuous dominant forest canopy across the parcel broken only by rocky bluff outcroppings along Five Branch and a small sliver of pasture along the driveway. Dominant trees, white and red oak and shortleaf pine, are 60+ or older, 75-90' in height, exhibit dbh's of 18 – 30"+, and occur at 70-100 BA across the parcel. Stand visibility is excellent. The midstory has good stocking and exhibits a wide species diversity. Due to the uneven-aged overstory, the understory contains a patchy diversity of both shade-tolerant and intolerant species. Prominent rock outcroppings are prevalent on the the upper slope of Five Branch drainage slope as well as frequent, individual rock formations scattered across the parcel.

Section 35 (Figures 1-4, 3-8, 3-9) is 40 acres of forested (primarily select-cut hardwood cutover) land located on the southwestern corner of Bone Hill south of Banner, Arkansas; although a small overgrown field is located in the northeastern corner. A reconnaissance site visit occurred on May 11, 2017. The western side of this parcel contains at least 3 residences along Arkansas State Road 87. Due to past selective timber harvests, much of the understory is extremely dense; however, many large, mature, older hardwood trees remain - making the dominant forest canopy uneven aged and discontinuous. Midstory, where present, is extremely dense and composed of early successional, shade-intolerant species. One invasive species of vegetation (Chinese privet) was observed in the northeastern parcel corner.

EOI #728

EOI #728 (Figure 1-5, 3-10, 3-11) consists of two (2) parcels totaling approximately 325 acres of privately owned surface in northwestern Cleburne County within 3 miles east of Prim, Arkansas in north-central Arkansas, part of the Ozark Plateau physiographic region.

Section 9 (Figures 1-5, 3-10, 3-11) is 205 acres of forested and open land north of Everett Ridge in the southern portion of Section 9. Site visit permission was not obtained for approximately 110 acres of this Section 9 parcel. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), USGS topographic quadrangle 1:24,000 maps, and neighboring landowners. Due to the proximity to other nearby parcels in EOI #728, plant and animal species are expected to be similar to those found in the surrounding Cleburne County area. Panther Skin Creek runs north-south through the eastern end of the parcel. Bear Hollow runs east-west through the parcel culminating at Stubbs Point.

A reconnaissance site visit occurred on May 12, 2017 with the landowner of the remaining 95 acres. The visit revealed dominant tree species were shortleaf pine, various oak and hickory species, and other hardwoods including: white oak, northern red oak, blackjack oak, mockernut and shellbark hickory, blackgum, white ash, honey locust, and eastern red cedar. Dominant canopy trees were mature for both shortleaf pine and hardwood tree species, exhibited BAs of 70-85, and heights to 80 feet or greater. Observed understory and midstory species include mockernut and shellbark hickory, white ash, muscadine grape, pawpaw, red buckeye, poison ivy, tall fescue (*Festuca arundinacea*), smooth sumac (*Rhus glabra*), and broomsedge bluestem. Midstory visibility was good and was composed of primarily hickory and ash species. Understory was composed primarily of shade tolerant species. Storm-damaged timber throughout this parcel was observed from recent weather events and will increase future understory density and species composition. One upland pasture (~15 acres) of tall fescue occupied the northwestern portion of the parcel. This parcel is within the karst region located in northern Arkansas.

Section 15 (Figures 1-5, 3-12, 3-13) is 120 acres of heavily forested land lying on the southeastern side of Everett Ridge. Site visit permission was not obtained for this parcel. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), and USGS topographic quadrangle 1:24,000 maps. Due to the proximity to other nearby parcels in EOI #728, plant and animal species are expected to be similar to those found in the surrounding Cleburne County area.

EOI #730

EOI #730 (Figures 1-6, 3-14, 3-15) consists of one (1) parcel totaling 40 acres of privately owned surface in the northwest corner of Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcel is located on the eastern slope of Bliss Mountain.

Section 23 is 40 acres of mature, shortleaf pine-mixed hardwood forest located on the northeast corner of Bliss Mountain with Wild Goose Creek running north-south through the northeastern parcel corner. A reconnaissance site visit occurred on May 12, 2017, courtesy of an adjacent landowner, and revealed dominant tree species were shortleaf pine, various oak and hickory species, and other hardwoods including: white oak, blackjack oak, northern red oak, mockernut hickory, red hickory, shellbark hickory, and sweetgum. The stand exhibited shortleaf pine, and white and red oaks of approximately 60-70 years old and up to 26" dbh with an average BA of 80-85 or higher. A dense midstory existed containing mainly shade tolerant species. The understory was sparse, containing mostly hardwood leaf litter, vines, and woody debris.

Observed understory and midstory species include variable panic grass, witchhazel (*Hamamelis vernalis*), downy milkpea, deerberry, possumhaw, flowering dogwood, hickory, poison ivy, ebony spleenwort, mountain laurel (*Kalmia latifolia*), American elm, and Virginia creeper.

A small logging road enters the property from the southwest and exits the southeastern corner. A prescribed burn within the past two years was evident on the southern and western areas of the parcel.

EOI #733

EOI #733 (Figures 1-7, 3-16, 3-17) consists of one (1) parcel totaling approximately 65 acres of privately owned surface in the southeastern corner of Van Buren County in north-central Arkansas, part of the Arkansas River Valley physiographic region.

EOI #733 is an irregularly shaped 65 acre parcel lying on the north side of White Oak Mountain along the North Fork Cadron Creek. A reconnaissance site visit to EOI #733, on April 26, 2017 with the landowner, revealed dominant tree species were shortleaf pine, various oak and hickory species, and other hardwoods including: white oak, southern red oak, swamp chestnut oak, northern red oak, eastern red cedar, sweetgum, and river birch (*Betula nigra*). Stands consisted of mature hardwoods and shortleaf pine approximately 50 years age or greater, heights of 75-95', and BAs of 80-110. Midstory species were diverse and well-stocked. The understory was diverse, patchy, and primarily composed of shade-tolerant species. One fenced, central livestock pasture was present on the parcel. It contained low fencerows with early succession species and tall fescue grass surrounded by mixed pine-hardwood slope forest.

Observed understory and midstory species include American and winged elm, flowering dogwood, wild azalea (*Rhododendron canescens*), eastern red cedar, tree sparkleberry, red mulberry, red buckeye, poison ivy, variable panic grass, tall fescue, broomsedge bluestem, black cherry, redbud, deerberry, American beautyberry (*Callicarpa americana*), blackberry, greenbrier, Japanese honeysuckle (*Lonicera japonica*), Chinese privet, Virginia spiderwort (*Tradescantia virginiana*), eastern hophornbeam, fire pink (*Silene virginica*), fragrant sumac (*Rhus aromatica*), spreading pricklypear (*Opuntia humifusa*), American beech, and muscadine grape.

EOI #737

EOI #737 (Figures 1-8, 3-18, 3-19) consists of one (1) parcel totaling approximately 10.63 acres of privately owned surface in eastern Van Buren County in north-central Arkansas, part of the Arkansas River Valley physiographic region. The proposed parcel is located on the south bank of Greers Ferry Lake.

Section 33 is 10.63 acres of mixed pine-hardwood forest on the eastern side of a peninsula in Greers Ferry Lake, south and west of Sugarloaf Mountain. Site visit permission was not obtained for this parcel; however, permission was obtained to access the U.S. Army Corps of Engineer (USACE) property that bordered the parcel on three (3) sides. Parcel information was obtained from viewing the parcel from the USACE boundary.

A reconnaissance site visit to EOI #737 on June 13, 2017 revealed dominant tree species were shortleaf pine, various oak and hickory species, and other hardwoods including: northern red oak, eastern red cedar, post oak, white oak, persimmon, southern red oak, blackjack oak, and tupelo gum. Observed understory and midstory species include red buckeye, blueberry, elm, variable panic grass, broomsedge, blackberry, fragrant sumac, greenbrier, muscadine grape, greater tickseed (*Coreopsis major*), and Virginia plantain (*Plantago virginica*). One road enters the parcel from the southeast and runs to the northeastern parcel edge.

The middle and eastern portion of the parcel is cleared but rapidly being overgrown with blackberry, sumac, broomsedge, and volunteer pine. There are a few, scattered, large, older pines and hardwoods surrounding what appears to be an old cabin and outbuilding. The northern end of the parcel consists of large grassy opening containing a deer stand and feeder. The western length of the parcel consists of a mature, high volume, naturally regenerated pine stand. As a result, the midstory is extremely dense and the understory is extremely sparse. There is a small area of mature hardwoods located on the northwestern corner of the parcel. They are approximately 65-80' in height, 14-20" dbh, and 70-80 BA. This area has very little midstory and contains the most understory present on the parcel.

EOI #738

EOI #738 (Figures 1-9 to 1-13, 3-20 to 3-29) consists of five (5) parcels totaling approximately 765.33 acres of privately owned surface in central Van Buren County in north-central Arkansas. Four (4) of these parcels totaling approximately 645.33 acres are part of the Ozark Plateau physiographic region. One (1) T. 11N., R. 14W., Sec. 31, E2NE, SWNE totaling approximately 120 acres is part of the Arkansas River Valley physiographic region.

Section 6 (Figures 1-9, 3-20, 3-21) is 363.54 acres of forest along approximately 1 mile of Hurricane Creek in western and northern Section 6, south of Coppers Knob. A reconnaissance site visit occurred on May 9, 2017. There were two owners for this parcel; one a private timber corporation and the other a private individual. Dominant tree species for both consisted of plantation loblolly pine of varying ages on upland sites, and a mix of mature pine-hardwood on the slopes leading down to Hurricane Branch. Other species included shellbark hickory, persimmon, sweetgum, white oak, northern red oak, red maple, and white ash. Observed understory and midstory species include sumac, American beautyberry, sassafras, southern lady fern, blackberry, poison ivy, black cherry, sourwood (*Oxydendrum arboreum*), flowering dogwood, red maple, *Vaccinium* spp, and broomsedge.

Section 4 (Figures 1-10, 3-22, 3-23) is a north-south oriented, 80 acre block of mature, mixed pine-hardwood forest that crosses Archey Creek and includes a small sliver of land on the east side of Archey Creek, west of Clinton Mountain. Site visit permission was not obtained for most of this parcel. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), USGS topographic quadrangle 1:24,000 maps, and observation. Site visit permission for 10.4 acres on the northwestern portion of the 80 acre parcel was obtained. A reconnaissance site visit occurred on April 26, 2017 and revealed dominant tree species were shortleaf pine, various oak and hickory species, and other hardwoods including: white oak, northern red oak, post oak, chestnut oak, mockernut hickory, shellbark hickory, red maple, blackgum, sweetgum, and white ash.

Observed understory and midstory species include flowering dogwood, winged elm, red buckeye, muscadine grape, redbud, sweetgum, American elm, American beech, red mulberry, sweet violet, southern lady fern, possumhaw, black cherry, ebony spleenwort, Virginia creeper, poison ivy, eastern red cedar, blackberry, spurred butterfly pea, wild strawberry, red chokeberry, devil's walkingstick, strawberry bush, Christmas fern, deerberry, and sassafras.

Dominant trees form a continuous, uneven-aged canopy across the entire parcel. Forest stand age is 50+, tree heights are 70-100', basal areas range from 70-100, and 14-24"+ in dbh. An extremely dense midstory composed of shade-tolerant species is present. As a result, the understory is limited to a low diversity of shade-tolerant species and is composed primarily of a carpet of poison ivy over much of the parcel. Rock outcroppings are prevalent on upper drainage slopes and extend downslope toward Archey Creek. A maintained Right-of-Way (ROW) is present on the southern property border. The remaining ~ 70 acres were viewed from the western boundary line and appeared to have similar forest vegetation and characteristics. One residence is present on the southern portion of the parcel, north of the ROW.

Section 18 (Figures 1-11, 3-24, 3-25) is 121.99 acres of mixed pine-hardwood forest and loblolly pine plantations on the southwest slope of Mt. Evans. A reconnaissance site visit occurred on May 9, 2017. The west fork of upper Bradley Branch flows northwest-southeast through this parcel. Section 18 is composed of primarily 14-18 year-old plantation loblolly pine except for mature, hardwood-dominated slopes on the southwest side of Mt. Evans. Rugged, rock outcroppings formed bluffs that limited westward movement and close observation of the slope hardwood forest to the southwest and below the loblolly pine plantations.

Dominant tree species observed outside of loblolly pine plantations were shortleaf pine, various oak and hickory species and other hardwoods including: post oak, persimmon, sweetgum, mockernut hickory, sourwood, northern red oak, tupelo gum, black cherry, white ash, American beech, and white oak.

Observed understory and midstory species include smooth and winged sumac, blackberry, broomsedge bluestem, blueberry, common evening-primrose (*Oenothera biennis*), downy milkpea, pinebarren ticktrefoil, sassafras, red maple, flowering dogwood, poison ivy, wild bergamot (*Monarda fistulosa*), dwarf hawthorn (*Craetagus uniflora*), spurred butterfly pea, Virginia creeper, sensitive-briar (*Mimosa microphylla*), Sericea lespedeza (*Lespedeza cuneata*), summer grape (*Vitis aestivalis*), redbud, daisy fleabane (*Erigeron annuus*), trailing lespedeza, oxeye daisy (*Leucanthemum vulgare*), tall fescue, American beautyberry, southern lady fern, witchhazel, and wild blue phlox (*Phlox divaricata*).

Section 31 (Figures 1-12, 3-26, 3-27) is 120 acres of hardwood forest less than a mile northwest of Culpepper Mountain. Two unnamed tributaries occur on this parcel, flow into a man-made pond, leave the parcel for approximately 0.5 mile and eventually drain into the South Fork of the Little Red River. Significant portions of this acreage were cutover mixed hardwood and pine forest from a timber harvest operation within the past 3-4 years. A reconnaissance site visit to EOI #738 on May 9, 2017 revealed dominant tree species were shortleaf and loblolly pine, various oak (northern red, southern red, white, and post), white ash, and hickory (mockernut, red, shellbark) species. Understory species consisted of: sumac, muscadine, sweetgum, Virginia creeper, blackberry, American beautyberry, *Vaccinium* spp, southern dogwood, black cherry, blackgum, eastern red cedar, panic grasses, broomsedge, downy milkpea, butterfly pea, sawbrier, elm, bracken and Christmas fern, milkweed (*Asclepias syriaca*), devil's walking stick. Invasive species noted include autumn olive, Chinese privet, and Paulownia tree.

Small stands of standing, mature shortleaf pine and mixed hardwood species were left within the cutover portions of the previous timber harvest; presumably due to steep rock outcropping features that prohibited logging access. These stands contain trees of similar age class, size, height, and species composition and arguably accurately represent pre-harvest stand characteristics. These stands contain hardwood trees that are 60+ years, reach 18-24" + dbh, heights of 65-85', and have basal areas of 60-85. Cutover areas have sparse to non-existent overstory canopy and virtually no mid-story. Understory consists of knee to head-high vine, woody, grass, and forb vegetation.

Section 1 (Figures 1-13, 3-28, 3-29) parcel is a 40 acre forested block consisting of 16 year old plantation loblolly pine surrounding a drainage featuring mixed pine-hardwood slope forest on the west side of Pee Dee Creek, one mile east of Clinton Mountain. A reconnaissance site visit occurred on May 10, 2017. Dominant tree species observed outside of pine plantations were shortleaf pine, various oak and hickory species and other hardwoods including: post oak, persimmon, sweetgum, mockernut hickory, sourwood, northern red oak, tupelo gum, black cherry, white ash, American beech, and white oak.

Observed understory and midstory species include smooth and winged sumac, blackberry, broomsedge bluestem, blueberry, common evening-primrose, downy milkpea, stiff ticktrefoil (*Desmodium obtusum*), sassafras, red maple, flowering dogwood, poison ivy, wild bergamot, dwarf hawthorn, spurred butterfly pea, Virginia creeper, sensitive-briar, Chinese lespedeza, summer grape, redbud, daisy fleabane, trailing lespedeza, oxeye daisy, tall fescue, American beautyberry, southern lady fern, witchhazel, and wild blue phlox.

Pine plantations were approximately 35-45' in height, 8-14" dbh, and 110-120 BA. Very little midstory or understory was present. Slope hardwoods leading down to Pee Dee Creek were 65-80' in height, 14-20" dbh, and 70-85 BA. Understory was light, mostly leaf litter and woody debris. Midstory was present and also light.

Sec 2 (Figures 1-13, 3-28, 3-29) is 40 acres of a mix of residences, mixed pine-hardwood cutover, and hardwood forest on the eastern slope of Mill Hollow, 0.5 mile northeast of Clinton Mountain. Site visit permission was not obtained; however, Henderson Road runs north-south across the southeastern corner of this parcel. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), USGS topographic quadrangle 1:24,000 maps, and observation. Reconnaissance site visit information was obtained by driving up Henderson Road on May 10, 2017. Two residences are present on this parcel.

Dominant tree species observed were shortleaf and loblolly pine, various oak and hickory species and other hardwoods including: post oak, southern red oak, blackgum, persimmon, sweetgum, mockernut hickory, white ash, and white oak. There appeared to be a mixture of cutover and mature forest present surrounding the two residences visible from the road.

Observed understory and midstory species include winged sumac, blackberry, broomsedge bluestem, Chinese privet, mimosa, blackberry, sassafras, red maple, flowering dogwood, poison ivy, Virginia creeper, Sericea lespedeza, and American beautyberry.

EOI #739

EOI #739 (Figures 1-14 to 1-16, 3-30 to 3-35) consists of seven (7) parcels totaling approximately 507.5 acres of privately owned surface in central Van Buren County in north-central Arkansas, part of the Ozark Plateau physiographic region.

Sec 1 (Figures 1-14, 3-30, 3-31) is 120 acres of forest on the western slope drainage of Hurricane Branch, less than one mile due south of Coppers Knob, on the eastern side of Sec 1. Site visit permission for this parcel was not obtained. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), and USGS topographic quadrangle 1:24,000 maps. However, a reconnaissance site visit to EOI #738, Sec 6 occurred on May 9, 2017 that had road passage through the northernmost part of this parcel. Dominant trees consisted of 40-50' tall, plantation loblolly pines with a midstory of sweetgum, hickory, elm, and oak. The understory consisted of poison ivy, greenbrier, sumac, panic grasses, flowering dogwood, and *Vaccinium* species. A mix of mature pine-hardwood was present on the slopes leading down to Hurricane Branch. The separate, southern part of the Section 1 parcel remained unseen; however, vegetation is reasonably expected to be similar to that found on EOI #738, Sec 6 and on the northern portion of this parcel.

Sec 13 (Figures 1-15, 3-32, 3-33) is 40 acres of mature, mixed pine-hardwood forest on the southwestern slope of Mt. Evans in the northeast corner of Sec 13. A steep-sloped ravine bisected the parcel from northwest-southeast. A reconnaissance site visit occurred on May 10, 2017. The southwestern corner of the parcel was terraced and cleared for aesthetic purposes; i.e. the panoramic view from a nearby recreational residence. Dominant tree species were shortleaf pine, various oak (white, northern red, post) and hickory (mockernut, shellbark) species, and other hardwood species including: elm, sweetgum, red maple, honey locust, black cherry, and persimmon. Understory species consisted of: poison ivy, blackberry, greenbrier, deerberry, Virginia creeper, sumac, muscadine grape, American elm, possumhaw, *Vaccinium* species, and witchazel.

Sec 23 (Figures 1-15, 3-32, 3-33) is 40 acres of mostly 4 year-old, plantation, loblolly pine forest on the western slope drainage of West Hollow, approximately 1 mile north of Walnut Grove, Arkansas on Arkansas State Highway 95. It lies in the south-central part of Sec 23. A reconnaissance site visit occurred on May 10, 2017. Dominant tree species were 10-15' loblolly pine and a mixture of taller, older shortleaf and loblolly pine, and hardwoods present on the steeper slopes leading down into West Hollow. Understory species consisted of: broomsedge, blackberry, sumac, American beautyberry, greenbrier, and poison ivy.

Sec 24 (Figures 1-15, 3-32, 3-33) is 40 acres of forest in the north-central part of Sec 24. Portions of this parcel cover both sides of Brickey Hollow. Site visit permission for this parcel was not obtained. Vegetation is reasonably expected to be similar to other nearby parcels within this EOI.

Sec 26 (Figures 1-15, 3-32, 3-33) is an east-west 80 acre block lying 0.5 mile northwest of Walnut Grove, Arkansas on Arkansas State Highway 95. A reconnaissance site visit occurred on May 10, 2017.

The western forty acres consists of 4 year-old commercial plantation loblolly pine owned by a private timber company. Dominant trees were 10-15' loblolly pine mixed with an older stand of mature loblolly pine. Understory in the younger stand consisted of broomsedge, blackberry, sumac, eastern baccharis (*Baccharis halimifolia*), sumac, greenbrier, and poison ivy. Understory in the mature stand consisted of sweetgum, elm, partridgeberry (*Mitchella repens*), Virginia creeper, greenbrier, and poison ivy.

The eastern forty acres was composed of a mature shortleaf pine-hardwood mixture that is part of an older homestead. Dominant tree species were various shortleaf pine, oak and hickory species, and other hardwoods including: white oak, northern red oak, blackjack oak, southern red oak, post oak, walnut (*Juglans nigra*), toothache tree (*Zanthoxylum clava-herculis*). Understory species consisted of: *Vaccinium* spp, downy butterfly pea, paw-paw, elephantsfoot (*Elephantopus tomentosus*), stiff ticktrefoil (*Desmodium obtusum*), redbud, sensitive brier, broomsedge, blackgum, yucca, and sumac.

Sec 20 (Figures 1-16, 3-34, 3-35) is 67.5 acres of thinned, commercial plantation loblolly pine forest on the north slope drainage into the South Fork Little Red River, northwest of Crowell Mountain. A reconnaissance site visit occurred on May 9, 2017. Dominant tree species were 23 year-old loblolly pines. Understory and midstory species consisted of greenbrier, eastern red cedar, muscadine grape, blackberry, witchhazel, poison ivy, panic grasses, *Vaccinium* spp., stiff ticktrefoil, red maple, flowering dogwood, mockernut hickory, southern lady fern, wild phlox, white ash, black cherry, sassafras, post oak, white oak, blackjack oak, and elm.

Sec 29 (Figures 1-16, 3-34, 3-35) is an east-west block of 120 acres of mixed shortleaf pine-hardwood forest in southern Sec 29, located on the eastern slope of Gulf Mountain and across the South Fork Little Red River. Topography slopes downward from west to east crossing Lo Gap Road and the Little Red River. A reconnaissance site visit to Sec 29 occurred on May 9, 2017 revealed dominant tree species were shortleaf pine, various oak and hickory species, and other hardwoods including: red maple, blackjack oak, mockernut and shellbark hickory, blackgum, white oak, persimmon, northern red oak, and post oak. Understory species consisted of witchhazel, greenbrier, flowering dogwood, *Vaccinium* species, sassafras, pawpaw, American and winged elm, and poison ivy. Rock outcroppings were present.

EOI #743

EOI #743 (Figures 1-17, 3-36, 3-37) consists of two (2) parcels totaling approximately 120 acres of privately owned surface in northwestern Van Buren County in north-central Arkansas, part of the Ozark Plateau physiographic region.

Sec 15 (Figures 1-17, 3-36, 3-37) is a 80 acre north-south block of hardwood forest with one small clearing in the northeast corner. Archey Creek is present in the southwestern corner of the parcel. It is owned by the Arkansas Game and Fish Commission (AGFC) and is part of the Scott Henderson Gulf WMA. Sec 26 (Figures 1-17, 3-38, 3-39) is 40 acres of privately owned hardwood forest in the northwest corner of Sec 26.

Permission was not obtained for a reconnaissance site visit to either parcel on EOI #743. Parcel information was obtained from one or more of the following sources: county land records, aerial

imagery (Google Earth Pro), USGS topographic quadrangle 1:24,000 maps, employees, and neighboring landowners. An AGFC Conservation Officer relayed that mature hardwood tree species, primarily oak/hickory dominated the roadless, 80 acre parcel located in Section 15. A neighboring landowner controlling road access (Rocky Hill road) to the same parcel confirmed tree species were various oak and hickory species and that the terrain was extremely steep leading down to Archey Creek. The landowner was unaware of any karst formations located on the parcel. Plant and animal species for both parcels are reasonably expected to be similar to that found on other vicinity EOIs located in Van Buren County and/or around Copper Spring Mountain.

EOI #961b

EOI #961b (Figures 1-18, 3-40, 3-41) is a single parcel totaling approximately 11.9 acres of privately owned surface in western White County in central Arkansas, part of the Arkansas River valley physiographic region.

A significant portion of EOI #961b is water. Much of the parcel appears to be located lying within the actual riverbed of the Little Red River out to the centerline of the river. The remainder of the parcel is composed of steep, wooded bluffs leading to the western riverbank. Permission for a reconnaissance site visit was not obtained. The adjacent land to the west of this parcel was previously leased for oil and gas mineral development. It was described in 2013 as a mature oakpine forest consisting of northern red oak, white oak, sweetgum, and Eastern red cedar with an understory of various sedges, variable panic grasses, sassafras, persimmon, greenbrier, sumac, poison ivy, and leafy debris. Any portion of this parcel extending onto land would reasonably be expected to contain similar vegetation.

EOI #1086

EOI #1086 (Figures 1-19, 3-42, 3-43) is a single parcel totaling approximately 80 acres of privately owned surface in southwestern Cleburne County in north-central Arkansas, part of the Arkansas River Valley physiographic region.

Sec 6 is an 80 acre east-west block parcel composed of a mix of pastureland and shortleaf pine-hardwood forest. A reconnaissance site visit to EOI #1086 on April 24, 2017 revealed dominant tree species were shortleaf pine, various oak and hickory species, and other hardwood species including blackjack oak, post oak, mockernut hickory, blackgum, southern red oak, white oak, northern red oak, and white ash. Understory species consisted of *Vaccinium* species, *Panicum* grasses, muscadine grape, white oak, flowering dogwood, eastern red cedar, spurred butterfly pea, tick trefoil, greenbrier, bee balm, Virginia creeper, American elm, blackberry, elephantsfoot, Chinese privet, fragrant sumac, fire pink, skullcap (*Scutellaria integrifolia*), and tall fescue in pastures.

This parcel was composed of middle-aged, mature shortleaf pine-mixed hardwood forest approximately 65-80' in height, 12-20" dbh, and 60-75 BA. Some midstory is present; mainly consisting of hickory, elm, blackgum, and sweetgum. Understory was very light due to a burning regime. Muscadine grape was the most common understory plant. Small, scattered rock was prevalent throughout. A prescribed burn had taken place within the previous two years due to evidence of charred wood, a lack of leafy debris, and the presence of abundant hardwood regeneration.

EOI #1103

EOI #1103 (Figures 1-20, 3-44, 3-45) is a single parcel totaling approximately 80 acres of privately owned surface in southern Stone County in north-central Arkansas, part of the Ozark Plateau physiographic region.

Sec 36 is an east-west 80 acre block of hardwood forest with Wild Goose Creek running northwest –south central across the parcel. A reconnaissance site visit to EOI #1103 with the landowner occurred on June 16, 2017. Dominant tree species were shortleaf pine, various oak and hickory species, and other hardwoods including white ash, southern red oak, shellbark hickory, persimmon, white oak, northern red oak, and mockernut hickory. Understory and midstory species included common alder (*Alnus glutinosa*), Virginia willow (*Itea virginica*), witchhazel, greater tickseed, and flowering dogwood.

This parcel was composed of older, mature shortleaf pine-mixed hardwood forest approximately 65-90' in height, 12-24" dbh, and 70-95 BA. There was a medium to heavy midstory present on this parcel resulting in a light understory. There was a steep, rocky bluff outcropping present along the eastern bank of Wild Goose Creek on the south side of the parcel. A maintained ROW runs along the southern border of this parcel.

EOI #1148

EOI #1148 (Figures 1-21, 3-46, 3-47) is a single parcel totaling approximately 40 acres of privately owned surface in northern Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region.

Sec 36 is 40 acres of commercial loblolly pine plantation owned by a private timber corporation. The parcel is bisected by Wildcat Hollow, running northwest to southeast. Regenerating loblolly pine approximately 12-20' in height is the dominant canopy (age 4 on the north side of Wildcat Hollow and age 6 on the south side of Wildcat Hollow). Mature shortleaf pine- hardwood forest approximately 70-85' in height, 12-24" dbh, and 70-80 BA exists in small lines and patches on the tract and along the Wildcat Hollow drainage. Hardwood midstory was heavy and understory light with a dominant greenbrier presence. Loblolly plantation midstory was very light (sumac, eastern baccharis) with a resulting heavy understory. Steep, rocky bluffs exist along each side of Wildcat Hollow.

Outside of plantation loblolly, dominant tree species were shortleaf pine, various oak and hickory species and other hardwood species including: white oak, American elm, mockernut hickory, persimmon, blackjack oak, white ash, northern red oak Observed understory and midstory species included smooth ticktrefoil (*Desmodium laevigatum*), variable panic grass, spiked hoarypea (*Tephrosia spicata*), red maple, flowering dogwood, greenbrier, eastern hophornbeam, ebony spleenwort, red buckeye, yellow thistle (*Cirsium horridulum*), eastern baccharis, broomsedge bluestem, redbud, American beautyberry, brackenfern, blackberry, winged sumac, and eastern red cedar.

EOI #1174

EOI #1174 (Figures 1-22, 3-48, 3-49) is a single parcel totaling approximately 20 acres of privately owned surface in north-central Van Buren County in north-central Arkansas, part of the Ozark Plateau physiographic region.

This is a 20 acre, slim north-south oriented rectangle of hardwood drainage located in the northernwestern reach of Collins Hollow in the southeast corner of Sec 20. Permission was not obtained for a reconnaissance site visit. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), and USGS topographic quadrangle 1:24,000 maps.

Due to the nature of the extremely steep terrain on EOI #1174, mature slope hardwoods are likely to be present. Plant and animal species are expected to be similar to that found on other vicinity EOIs located in Van Buren County and/or around Clinton Mountain.

EOI #1469

EOI #1469 (Figures 1-23, 3-50, 3-51) is a single parcel totaling approximately 40 acres of privately owned surface in northwest Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region.

EOI #1770 contains a 40 acre parcel in Section 23 that is owned by the same private landowner and adjoins this parcel on the west. Both 40 acre parcels are landlocked by neighboring landowners. An unnamed flowing tributary flows eastward along the southern edge of EOI #1469.

Sec 24 is a 40 acre parcel of hardwood forest on the western slope drainage into Sugar Camp Creek in the southwest corner of Sec 24. A reconnaissance site visit on May 11, 2017 revealed dominant tree species were shortleaf pine, various oak and hickory species and other hardwoods including: white oak, post oak, blackjack oak, northern red oak, chestnut oak, white ash, mockernut hickory, shellbark hickory, and persimmon.

Dominant trees form a continuous, uneven-aged canopy. These trees are 65-85' in height, 14-24" dbh, and have a basal area of 70-95. A dense midstory is present resulting in a relatively light understory consisting primarily of leaf litter and woody debris. Observed understory and midstory species included eastern hophornbeam, elm, flowering dogwood, deerberry, witchhazel, variable panic grass, blueberry, prostrate ticktrefoil (*Desmodium rotundifolium*), Virginia creeper, tree sparkleberry, and poison ivy.

EOI #1770

EOI #1770 (Figures 1-24, 3-52 to 3-55) consists of two (2) parcels totaling approximately 80 acres of privately owned surface in northwest Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region. The proposed parcels are located at:

Sec 4 (Figure 1-24, 3-52, 3-53) is 40 acres of pine-hardwood mixed forest in Sutton Hollow, 0.5 mile south of Nelson Ridge. It is a private in-holding within Cherokee WMA. A reconnaissance site visit to Section 4 occurred on May 11, 2017 and revealed a mature, mixed shortleaf pine-

hardwood forest with dominant tree species of various oak and hickory species and other hardwood species including: white oak, northern red oak, post oak, American elm, red maple, sweetgum, white ash, and persimmon. Dominant trees form a continuous, uneven-aged canopy across the parcel. These trees are approximately 65-80' in height, 14-22" dbh, and 65-80 BA. Midstory is moderate in density and species diversity. Understory is light and moderate in density and species diversity. Observed understory and midstory species included blueberry, red maple, red buckeye, black cherry, variable panic grass, Virginia creeper, poison ivy, flowering dogwood, greenbrier, persimmon, ebony spleenwort, eastern red cedar, and tree sparkleberry.

Sec 23 (Figures 1-25, 3-54, 3-55) is 40 acres of hardwood forest one mile east of Arkansas State Highway 225, 0.5 mile west of Sugar Camp Creek in the southeast corner of Sec 23. EOI #1469 contains a 40 acre parcel in Section 24 that is owned by the same private landowner and adjoins this parcel on the east. Both 40 acre parcels are landlocked by neighboring landowners.

A reconnaissance site visit to Section 23 occurred on May 11, 2017 revealed a mature, mixed shortleaf pine-hardwood forest with dominant tree species of various oak and hickory species and other hardwood species including: white oak, northern red oak, post oak, American elm, red maple, sweetgum, white ash, and persimmon. Dominant trees form a continuous, uneven-aged canopy. These trees are 65-85' in height, 14-24" dbh, and have a basal area of 70-95. A dense midstory is present resulting in a relatively light understory consisting primarily of leaf litter and woody debris. Observed understory and midstory species included blueberry, tupelo gum, red maple, black cherry, variable panic grass, Virginia creeper, poison ivy, Alabama supplejack (*Berchemia scandens*), greenbrier, persimmon, eastern red cedar, deerberry, and red chokeberry.

EOI #1773

EOI #1773 (Figure 1-26, 3-56, 3-57) is a single parcel totaling approximately 20 acres of privately owned surface in northwest Cleburne County in north-central Arkansas, part of the Ozark Plateau physiographic region.

Sec 1 is a 20 acre parcel of hardwood forest on the west bank of the Middle Fork Little Red River. Permission was not obtained for a reconnaissance site visit. Parcel information was obtained from the following sources: county land records, aerial imagery (Google Earth Pro), and USGS topographic quadrangle 1:24,000 maps. Plant and animal species are expected to be similar to that found on other vicinity EOIs located in Cleburne County.

3.12.2 Wildlife

Wildlife species diversity and abundance is likely moderate on the following EOI #s: 737, 1086, 1174 due to the lack of wildlife habitat diversity and abundance in upland hardwoods containing few openings, early successional habitat, or waterbodies. Species likely present include birds of prey (owls – barred (*Strix varia*), great-horned (*Bubo virginianus*), short-eared (*Asio flammeus*), screech (*Megascops asio*), accipiter hawks – Coopers (*Accipiter cooperii*), Sharp-shin (*Accipiter striatus*)), cavity-nesting species (eastern wood-rat (*Neotoma floridana*), flying squirrel (*Glaucomys volans*), prothonotary warbler (*Protonotaria citrea*), squirrels – gray and fox (*Sciurus carolinensis* and *niger*) and raccoon (*Procyon lotor*)), neo-tropical songbird passerines during seasonal migration, white-tailed deer (*Odocoileus virginianus*), passing black bear (*Ursus*

americanus americanus), wild turkey (*Meleagris gallipavo*), mid-size predators (gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*)), and nuisance wildlife such as armadillo (*Dasypus novemcinctus*) and wild pigs (*Sus scrofa*). Surrounding areas contain a largely upland hardwood forest with some mixture of natural and planted pine forest.

Wildlife species diversity and abundance is likely moderate to high due to the addition of water bodies to the previously noted upland hardwood forest with some areas of planted pine on the following EOIs: 630 (Choctaw Creek), 726 (Five Branch, Little Bayou, Wolf Bayou), 728 (Clifty Creek, Panther Skin Creek), 730 (Wild Goose Creek), 733 (North Fork of Cadron Creek), 738 (Hurricane Branch, Archey Creek, Bradley Branch), 739 (Hurricane Branch, South Fork of the Little Red River), 743 (Archey Creek), 961b (Little Red River), and 1103 (Wild Goose Creek). Additionally, unnamed tributaries located in EOI #s 1086, 1148 (Wildcat Hollow), 1469 (flowing into Sugar Camp Creek from the west), and 1770 (Sutton Hollow) were observed. Although not visited, EOI #s 1174 (Collins Hollow) and 1773 (Stewart Hollow) likely have tributaries as well. Additional wildlife will include amphibians (frogs, mudpuppies, hellbenders), fish (minnows, darters, sculpins), invertebrates (insects, mollusks, crustaceans), mammals (bats, river otter (*Lontra canadensis*), muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), and wading birds.

Tourism and recreation are a major use of these ecoregions along with logging, poultry production, and limited agriculture. Fishing and hunting are popular pastimes in Arkansas and fish and game species populations are high enough to support these activities. Greers Ferry Lake and the Little Red River waterways support a public fishery and a local sportfishing industry. Major game animals in rural areas of north-central Arkansas include white-tailed deer, wild turkey, fox, gray squirrel, and raccoon. Public hunting is available on nearby Cherokee and Scott Henderson Gulf Mountain WMAs with restrictions enforced by the AGFC. Although the majority of the proposed lease parcels are managed for the private landowner use of timber, wildlife, and/or hunting; multiple private and commercial landowners of these parcels stated that hunting leases are used to generate annual income from their property and that wildlife values are important considerations in land use planning.

3.13 Special Status Species

3.13.1 State Listed Species

Tables 3-7 to 3-18 list rare invertebrate, vertebrate, and plant species documented to occur in Cleburne, Stone, Van Buren, and White Counties by the ANHC that have been given a State Rank of S1 (critically imperiled), S2 (imperiled) or S3 (rare) including the availability of suitable habitat on the parcel.

ANHC has found no records for the occurrence of rare plants and animals, outstanding natural communities, natural or scenic rivers, or other elements of special concern within the proposed sites. ANHC has located elements of special concern in the immediate surroundings of EOI #s:

726 - glade presence, nearby Foushee Cave and Natural Area – known roost site for threatened and endangered bat species,

- **728** presence of tributaries within the watershed of the Beech Fork of the Little Red River a waterbody designated as USFWS Critical Habitat for the yellowcheek darter, and listed by ADEQ as an Ecologically Sensitive Waterbody and Extraordinary Resource Water,
- **733** adjacent to the North Fork of Cadron Creek listed by ADEQ as Extraordinary Resource Water and designated an Arkansas Natural and Scenic River,
- 738 glade presence on Section 6 and 18, tributaries within the watershed of Archey Creek on Sections 2 and 6 as well as a portion of Archey Creek itself (Section 4) a waterbody designated as USFWS Critical Habitat for the yellowcheek darter, suitable habitat for the speckled pocketbook,
- **739** tributaries within the watershed of Archey Creek as well as a portion of Archey Creek itself in Section 29 and the South Fork of the Little Red River both streams have portions of USFWS designated Critical Habitat for the yellowcheek darter, both streams have portions that are ADEQ designated as Ecologically Sensitive Waterbody and Extraordinary Resource Water,
- **743** both parcels lie within the watershed of Archey creek and Section 15 parcel includes a portion of Archey Creek, an ADEQ designated Ecologically Sensitive Waterbody and Extraordinary Resource Water,
- **961b** the Little Red River on this reach has been designated by ADEQ as a Trout Water and is considered a significant fishery,
- **1174** within the watershed of Archey Creek, a waterbody that contains USFWS designated Critical Habitat for the yellowcheek darter, and is ADEQ designated as Ecologically Sensitive Waterbody and Extraordinary Resource Water.

Table 3-7. List of rare invertebrate species documented to occur in Cleburne County by the ANHC and the

availability of suitable habitat on the proposed tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Ozark Fanshell	Cyprogenia aberti	S3	G2G3Q	Yes
Baltimore Checkerspot	Euphydryas phaeton ozarkae	S3	G4T3	Potential
Ozark Pigtoe	Fusconaia ozarkensis	S3	G3G4	Yes
Speckled Pocketbook	Lampsilis streckeri	S1	G1Q	Yes
American Burying Beetle	Nicrophorus americanus	S1	G2G3	Potential
Byssus Skipper	Problema byssus	S3	G3G4	No
Ouachita Kidneyshell	Ptychobranchus occidentalis	S3	G3G4	Yes
Oak Hairstreak	Satyrium favonius ontario	S3	G4T4	Potential
Diana Fritillary	Speyeria diana	S2S3	G3G4	Yes
Purple Lilliput	Toxolasma lividum	S3	G3Q	Yes
Bleedingtooth Mussel	Venustaconcha pleasii	S3	G3G4	Yes
Rainbow	Villosa iris	S3	G5Q	Yes

Little Spectaclecase	Villosa lienosa	S3	G5	Yes
_		1		

Table 3-8. List of rare vertebrate species documented to occur in Cleburne County by the ANHC and the availability of suitable habitat on the proposed tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Cham shinned Hazzle	A a simit on atriatus	S3	G5	Yes
Sharp-shinned Hawk	Accipiter striatus	33	GS	ies
Common Wormsnake	Carphophis amoenus	S2	G5	Yes
Autumn Darter	Etheostoma autumnale	S3	G4	Potential
Yellowcheek Darter	Etheostoma moorei	S1	G1	Yes
Bald Eagle	Haliaeetus leucocephalus	S3B, S4N	G5	No
Four-toed Salamander	Hemidactylium scutatum	S2	G5	Yes
Northern long-eared Bat	Myotis septentrionalis	S1S2	G1G2	Yes
Longnose Darter	Percina nasuta	S3	G3	Yes
Hurter's Spadefoot	Scaphiopus hurterii	S2	G5	No

Table 3-9. List of rare plant species documented to occur in Cleburne County by the ANHC and availability of suitable habitat on the proposed tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Lobed Spleenwort	Asplenium pinnatifidum	S3	G4	Yes
Slender Wood Sedge	Carex gracilescens	S2	G5	Yes
Spreading Oval Sedge	Carex normalis	S1	G5	No
Eastern Star Sedge	Carex radiate	S1	G4	No
Blue Cohosh	Caulophyllum thalictroides	S2	G4G5	Yes
Ozark Spring-beauty	Claytonia ozarkensis	S2	GNR	Yes
Wavy Hair Grass	Deschampsia flexuosa	S2S3	G5	Potential
Three-way Sedge	Dulichium arundinaceum var. arundinaceum	S2S3	G5TNR	Potential
Arkansas alumroot	Heuchera villosa var. arkansana	S3	G5T3Q	Yes
Wild Hop	Humulus lupulus var. pubescens	S1S2	G5T4	Yes
Winterberry	Ilex verticillata	S2	G5	No
Engelmann's Quillwort	Isoetes engelmannii	S1	G4	Yes
Corkwood	Leitneria floridana	S3	G3	Potential
Yellow Monkey-flower	Mimulus floribundus	S2S3	G5	Yes
Nuttall's Pleat-Leaf	Nemastylis nuttallii	S2	G4	Yes
Hairy Mock Orange	Philadelphus hirsutus	S2S3	G5	Yes
French's Shooting-star	Primula frenchii	S2	G3	No
Riddell's Spike-moss	Selaginella arenicola ssp. Riddellii	S3	G4T4	No
Ovate-leaf Catchfly	Silene ovata	S3	G3	Yes
Water parsnip	Sium suave	S1S3	G5	Potential
Early Goldenrod	Solidago juncea	S1	G5	No
White Flat-top Goldenrod	Oligoneuron album	S1S2	G5	Yes

Ozark Spiderwort	Tradescantia ozarkana	S3	G3	Yes
Appalachian Filmy Fern	Trichomanes boschianum	S2S3	G4	Yes
Zigzag Bladderwort	Utricularia subulata	S2	G5	Potential
Northern Arrow-wood	Viburnum recognitum	S1	G4G5	Potential
Canadian White Violet	Viola canadensis var. canadensis	S2	G5T5	Yes

Table 3-10. List of rare invertebrate species documented to occur in Stone County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Elktoe	Alasmidonta marginata	S3	G4	No
Bowed Snowfly	Allocapnia oribata	S1	G1	Yes
Lace-winged Roadside- Skipper	Amblyscirtes aesculapius	S1S3	G3G4	No
Bell's Roadside Skipper	Amblyscirtes belli	S3S4	G3G4	Potential
A cave obligate pseudoscorpion	Apochthonius titanicus	S1	G1G2	Potential
An isopod	Caecidotea ancyla	S2	G3G4	Potential
An isopod	Caecidotea dimorpha	S2	G2G3	Potential
An isopod	Caecidotea stiladactyla	S3	G3G4	Potential
Boston Mountains Crayfish	Cambarus causeyi	S1	G2	Potential
Hell Creek Cave Crayfish	Cambarus zophonastes	G1	S1	No
Scrubland Tiger Beetle	Cicindela obsoleta	S1S2	G5	Potential
Ozark Fanshell	Cyprogenia aberti	S3	G2G3Q	No
White Liptooth	Daedalochila peregrine	SNR	G2	No
A beetle	Derops divalis	S1	GNR	Potential
Baltimore Checkerspot	Euphydryas phaeton ozarkae	S3	G4T3	Potential
Ozark Pigtoe	Fusconaia ozarkensis	S3	G3G4	Yes
A land snail	Gastrocopta rogersensis	S2	G3G4	No
Speckled Pocketbook	Lampsilis streckeri	S1	G1Q	Yes
An isopod	Ligidium elrodii	S2	G4G5	No
An isopod	Lirceus bicuspidatus	S2	G3Q	Potential
An isopod	Lirceus ouachitaensis	S1	GNR	Potential
Gap Ringed Crayfish	Orconectes neglectus chaenodactylus	S3	G5T3	No
Pyramid Pigtoe	Pleurobema rubrum	S2	G2G3	No
Round Pigtoe	Pleurobema sintoxia	S3	G4G5	No
Ouachita Kidneyshell	Ptychobranchus occidentalis	S3	G3G4	Potential
A springtail	Pygmarrhopalites clarus	S1S2	G4	Potential
Rabbitsfoot	Quadrula cylindrica cylindrical	S3	G3G4T3	Yes
Diana Fritillary	Speyeria diana	S2S3	G3G4	Yes
Ozark Cave Amphipod	Stygobromus ozarkensis	S2	G4	No

Purple Lilliput	Toxolasma lividum	S3	G3Q	No
Bleedingtooth Mussel	Venustaconcha pleasii	S3	G3G4	No
Rainbow	Villosa iris	S3	G5Q	Yes
Little Spectaclecase	Villosa lienosa	S3	G5	Yes
Arkansas Wedge	Xolotrema occidentale	SNR	G1	No

Table 3-11. List of rare vertebrate species documented to occur in Stone County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Ringed Salamander	Ambystoma annulatum	S3	G4	Yes
Mole Salamander	Ambystoma talpoideum	S3	G5	No
Common Wormsnake	Carphophis amoenus	S2	G5	Yes
Eastern Collared Lizard	Crotaphytus collaris	S2	G5	Yes
Autumn Darter	Etheostoma autumnale	S3	G4	Yes
Yellowcheek Darter	Etheostoma moorei	S1	G1	No
Grotto Salamander, Eastern Clade	Eurycea spelaea sp. A	S3	GNR	Potential
Ozark Pocket Gopher	Geomys bursarius ozarkensis	S1	G5T1T3	No
Bald Eagle	Haliaeetus leucocephalus	S3B, S4N	G5	No
Least Brook Lamprey	Lampetra aepyptera	S3	G5	No
American Brook Lamprey	Lethenteron appendix	S3	G4	No
Swainson's Warbler	Limnothlypsis swainsonii	S3B	G4	Yes
Wood Frog	Lithobates sylvaticus	S3	G5	Potential
Long-tailed Weasel	Mustela frenata	S3	G5	Potential
Gray Bat	Myotis grisescens	S2S3	G4	Yes
Eastern Small-footed Bat	Myotis lebeii	S1	G4	Yes
Northern long-eared Bat	Myotis septentrionalis	S1S2	G1G2	Yes
Indiana Bat	Myotis sodalist	S1	G2	Yes
Ozark Shiner	Notropis ozarcanus	S3	G3	No
Slender Glass Lizard	Ophisaurus attenuatus	S3	G5	Yes
Longnose Darter	Percina nasuta	S3	G3	No
Slenderhead Darter	Percina phoxocephala	S2	G5	No
Hurter's Spadefoot	Scaphiopus hurterii	S2	G5	No
Southeastern Shrew	Sorex longirostris	S2	G5	Yes
American Badger	Taxidea taxus	S1S2	G5	No
Southern Cavefish	Typhlichthys subterraneus	S1	G4	No

Table 3-12. List of rare plant species documented to occur in Stone County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Sharp-lobe Hepatica	Anemone acutiloba	S1S2	G5	Yes
Wood Anemone	Anemone quinquefolia var. quinquefolia	S2	G5T4T5	No

Taper-tip Wild Ginger	Asarum canadense var. acuminatum	S2	G5TNR	Yes
Tassel-flower	Brickellia grandiflora	S2	G5	No
Satin Brome	Bromus nottowayanus	S2	G3G5	Yes
Bush's Poppy-mallow	Callirhoe bushii	S3	G3	Yes
Carey's Sedge	Carex careyana	S3	G4G5	Yes
Heavy Sedge	Carex gravida	S2S3	G5	No
Hairy Sedge	Carex hirtifolia	S3	G5	Yes
Smooth-sheath Sedge	Carex laevivaginata	S2	G5	No
Bristly-stalk Sedge	Carex leptalea	S2S3	G5	Potential
Reznicek's Sedge	Carex reznicekii	S2	G5	Potential
Bur-reed Sedge	Carex sparganioides	S3	G5	Yes
Timid Sedge	Carex timida	S2S3	G2G4	Yes
Blue Cohosh	Caulophyllum thalictroides	S2	G4G5	Yes
Large-flower Tickseed	Coreopsis grandiflora var. saxicola	S3	G5T4	Yes
Showy Lady's-slipper	Cypripedium reginae	S1	G4	Potential
Trelease's Larkspur	Delphinium treleasei	S3	G3	Potential
Hay-scented Fern	Dennstaedtia punctilobula	S2	G5	Yes
Open-ground Whitlow- grass	Draba aprica	S2	G3	Potential
Spinulose Wood Fern	Dryopteris carthusiana	S1	G5	Potential
Yellow Coneflower	Echinacea paradoxa var. paradoxa	S2	G2T2	No
River-bank Wild Rye	Elymus riparius	S1S2	G5	Potential
Running Strawberry-bush	Euonymus obovatus	S3	G5	Potential
Pale Gentian	Gentiana alba	S1	G4	Potential
Bowman's Root	Gillenia trifoliate	S1	G4G5	Potential
Arkansas alumroot	Heuchera villosa var. arkansana	S3	G5T3Q	Yes
Rough Hawkweed	Hieracium scabrum	S2	G5	Potential
Wild Hop	Humulus lupulus var. pubescens	S1S2	G4T4	Yes
Shining Fir-moss	Huperzia lucidula	S2S3	G5	Potential
Butternut	Juglans cinerea	S3	G4	Yes
Ringseed Rush	Juncus filipendulus	S1	G5	Potential
Turk's-cap Lily	Lilium superbum	S1	G5	Yes
Lowland yellow- loosestrife	Lysimachia hybrid	S1	G5	Potential
Yellow Monkey-flower	Mimulus floribundus	S2S3	G5	Yes
Miterwort	Mitella diphylla	S2	G5	Potential
Nuttall's Pleat-Leaf	Nemastylis nuttallii	S2	G4	Yes
Interrupted Fern	Osmunda claytoniana	S1	G5	Potential
Showy Beardtongue	Penstemon cobaea	S3	G4	Potential
Hairy Mock Orange	Philadelphus hirsutus	S2S3	G5	1

Sand Phlox	Phlox bifida	S3	G5	No
Heart-leaf Plantain	Plantago cordata	S2	G4	Potential
Dwarf Chinquapin Oak	Quercus prinoides	SH	G5	Potential
Capillary Beaksedge	Rhynchospora capillacea	S2	G4	No
Ovate-leaf Catchfly	Silene ovata	S3	G3	Yes
Royal Catchfly	Silene regia	S2	G3	No
Water-parsnip	Sium suave	S1S3	G5	Potential
White Flat-top Goldenrod	Oligoneuron album	S1S2	G5	Yes
Shining ladies-tresses	Spiranthes lucida	S2	G5	Potential
Featherbells	Stenanthium gramineum	S3	G4G5	Yes
Celandine-Poppy	Stylophorum diphyllum	S3	G5	No
Ozark Spiderwort	Tradescantia ozarkana	S3	G3	Potential
Dwarf Bristle Fern	Trichomanes petersii	S2	G4G5	Potential
White trillium	Trillium flexipes	S1	G5	Potential
Rock elm	Ulmus thomasii	S2	G5	Potential
Ozark Cornsalad	Valerianella ozarkana	S3	G3	No
Bunchflower	Veratrum latifolium	S1	G5	Potential
Canadian White Violet	Viola canadensis var. canadensis	S2	G5T5	Yes
Sand Grape	Vitis rupestris	S3	G3	No
Barren-strawberry	Waldsteinia fragarioides	S1	G5	Potential

Table 3-13. List of rare invertebrate species documented to occur in Van Buren County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Elktoe	Alasmidonta marginata	S3	G4	No
Bowed Snowfly	Allocapnia oribata	S1	G1	Yes
Lace-winged Roadside- Skipper	Amblyscirtes aesculapius	S1S3	G3G4	No
Bell's Roadside Skipper	Amblyscirtes belli	S3S4	G3G4	Potential
Beach-dune Tiger Beetle	Cicindela hirticollis	S2S3	G5	Potential
Woodland Tiger Beetle	Cicindela unipunctata	S2	G4G5	Potential
An amphipod	Crangonyx aka	S1	G1	Yes
Ozark Fanshell	Cyprogenia aberti	S3	G2G3Q	No
Mottled Duskywing	Erynnis martialis	S2S3	G3	Potential
Ozark Pigtoe	Fusconaia ozarkensis	S3	G3G4	Yes
Sulphur Springs Diving Beetle	Heterostemuta sulphurius	S1	G1	No
Arkoma Fatmucket	Lampsilis hydiana	S3	GNR	No
Speckled Pocketbook	Lampsilis streckeri	S1	G1Q	Yes
Ozark Hickorynut	Obovaria arkansasensis	S2	GNR	Potential
Pyramid Pigtoe	Pleurobema rubrum	S2	G2G3	No
Round Pigtoe	Pleurobema sintoxia	S3	G4G5	No

Ouachita Kidneyshell	Ptychobranchus occidentalis	S3	G3G4	Yes
Rabbitsfoot	Quadrula cylindrica cylindrical	S3	G3G4T3	Yes
Salamander Mussel	Simpsonaias ambigua	S1	G3	Yes
Diana Fritillary	Speyeria diana	S2S3	G3G4	Yes
Purple Lilliput	Toxolasma lividum	S3	G3Q	No
Lilliput	Toxoplasma parvum	S3	G5	Potential
Pondhorn	Uniomerus tetralasmus	S2	G5	Potential
Bleedingtooth Mussel	Venustaconcha pleasii	S3	G3G4	No
Rainbow	Villosa iris	S3	G5Q	Yes
Little Spectaclecase	Villosa lienosa	S3	G5	Yes

Table 3-14. List of rare vertebrate species documented to occur in Van Buren County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Ringed Salamander	Ambystoma annulatum	S3	G4	Yes
Common Wormsnake	Carphophis amoenus	S2	G5	Yes
Spotfin Shiner	Cyprinella spiloptera	S1	G5	Potential
Willow Flycatcher	Empidonax traillii	S1B	G5	Yes
Autumn Darter	Etheostoma autumnale	S3	G4	Potential
Yellowcheek Darter	Etheostoma moorei	S1	G1	Yes
Bald Eagle	Haliaeetus leucocephalus	S3B, S4N	G5	No
Crawfish Frog	Lithobates areolatus	S2	G4	Potential
Gray Bat	Myotis grisescens	S2S3	G4	Yes
Northern long-eared Bat	Myotis septentrionalis	S1S2	G1G2	Yes
Ozark Shiner	Notropis ozarcanus	S3	G3	Potential
Slender Glass Lizard	Ophisaurus attenuatus	S3	G5	Yes
Longnose Darter	Percina nasuta	S3	G3	No
Queensnake	Regina septemvittata	S1	G5	Potential

Table 3-15. List of rare plant species documented to occur in Van Buren County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	e Scientific Name		Global	Suitable Habitat on Parcel
			Rank	
Spreading Dogbane	Apocynum androsaemifiolium	S1	G5	Potential
Lobed Spleenwort	Asplenium pinnatifidum	S3	G4	Yes
Bush's Poppy-Mallow	Callirhoe bushii	S3	G3	Yes
Carey's Sedge	Carex careyana	S3	G4G5	Yes
Hairy Sedge	Carex hirtifolia	S3	G5	Yes
Bur-reed Sedge	Carex sparganioides	S3	G5	Yes
Blue Cohosh	Caulophyllum thalictroides	S2	G4G5	Yes
Ozark Spring-beauty	Claytonia ozarkensis	S2	GNR	Yes
Hazel Dodder	Cuscuta coryli	SU	G5	Yes

Moore's Delphinium	Delphinium newtonianum	S3	G3	Potential
Southern Running-pine	Lycopodium digitatum	S1S2	G5	Potential
Leed's Wood Fern	Dryopteris x leedsii	S1	GNA	Yes
Three-way Sedge	Dulichium arundinaceum var. arundinaceum	S2S3	G5TNR	Potential
Small-head Pipewort	Eriocaulon koemickianum	S2	G2	Potential
Arkansas alumroot	Heuchera villosa var. arkansana	S3	G5T3Q	Yes
Engelmann's Quillwort	Isoetes engelmannii	S1	G4	Yes
Starry False Solomon's- Seal	Maianthemum stellatum	S1	G5	No
Nuttall's Pleat-Leaf	Nemastylis nuttallii	S2	G4	Yes
Hairy Sweet-Cicely	Osmorhiza claytonia	S1S3	G5	No
Yellow Nailwort	Paronychia virginica	S2	G4	No
Rough-seed Fameflower	Talinum rugospermum	S1	G3G4	No
Hairy Mock Orange	Philadelphus hirsutus	S2S3	G5	Yes
Rocky Mountain Sage	Salvia reflexa	SH	G5	No
Muhlenberg's Nut-rush	Scleria muehlenbergii	S1S2	G5	No
Ovate-leaf Catchfly	Silene ovata	S3	G3	Potential
Early Goldenrod	Solidago juncea	S1	G5	No
White Flat-top Goldenrod	Oligoneuron album	S1S2	G5	Yes
Celandine-Poppy	Stylophorum diphyllum	S3	G5	No
Silvery Aster	Symphyotrichum sericeum	S2	G5	Yes
Ozark Spiderwort	Tradescantia ozarkana	S3	G3	Yes
Zigzag Bladderwort	Utricularia subulata	S2	G5	Potential
Ozark Cornsalad	Valerianella ozarkana	S3	G3	No
Canadian White Violet	Viola canadensis var. canadensis	S2	G5T5	Yes

Table 3-16. List of rare invertebrate species documented to occur in White County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Hubricht's Long-	Allocrangonyx	S1?	G2G3	No
tailed Amphipod	hubrichti			
Ozark Fanshell	Cyprogenia aberti	S3	G2G3Q	Yes
Pink Mucket	Lampsilis abrupta	S2	G2	Yes
Hickorynut	Obovaria olivaria	S3	G4	Yes
Ohio Pigtoe	Pleurobema cordatum	S3	G4	Yes
Yehi Skipper	Poanes yehi	S1S3	G4	No
Rabbitsfoot	Quadrula cylindrica cylindrica	S3	G3G4T3	Yes
Diana Fritillary	Speyeria diana	S2S3	G3G4	Yes
Purple Lilliput	Toxolasma lividum	S3	G3Q	No

Table 3-17. List of rare vertebrate species documented to occur in White County by the ANHC and availability of suitable habitat to occur on the tract.

	Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat	
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				on Parcel
American Eel	Anguilla rostrata	S3	G4	Yes
Common	Carphophis	S2	G5	Yes
Wormsnake	comoenus			
Rafinesque's Big-	Corynorhinus	S3	G3G4	Yes
eared Bat	rafinesquii			
Autumn Darter	Etheostoma	S3	G4	Yes
	autumnale			
Bald eagle	Haliaeetus	S3BS4N	G5	No
	leucocephalus			
Crawfish Frog	Lithobates areolatus	S2	G4	Yes
Southeastern Bat	Myotis	S3	G4	Yes
	austroriparius			
Slender Glass	Ophisaurus	S3	G5	Yes
Lizard	attenuatus			
Paddlefish	Polyodon spathula	S3	G4	Yes
Strecker's Chorus	Pseudacris streckeri	S2	G5	Yes
Frog				
Eastern Spadefoot	Scaphiopus	S2	G5	No
	holbrookii			
Hurter's Spadefoot	Scaphiopus hurterii	S2	G5	No

Table 3-18. List of rare plant species documented to occur in White County by the ANHC and availability of suitable habitat to occur on the tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Hay-scented Fern	Dennstadtia punctilobula	S2	G5	Potential
Arkansas Alumroot	Heuchera villosa var arkansana	S3	G5T3Q	No
Hairy Mock Orange	Philadelphus hirsutus	S2S3	G5	Yes
Purple Fringeless Orchid	Platanthera peramoena	S2	G5	Potential
Pink Milkwort	Polygala incarnata	S1S2	G5	No
Featherbells	Stenanthium gramineum	S3	G4G5	Potential

3.13.2 Federally Listed Species

Section 7 of the ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are "likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species." Table 3-19 to Table 3-22 list threatened and endangered species documented by USFWS to occur in Cleburne, Stone, Van Buren, and White Counties, Arkansas. The table also notes the presence of suitable habitat on the parcel. Specific information regarding habitat requirements is provided below under each species section. Details regarding species habitat, habits, threats and other information has been obtained from the Nature Serve website (www.natureserve.org) and published literature.

3.13.2.1 Special Status Species (Cleburne County)

Table 3-19. List of threatened and endangered species documented to occur in Cleburne County by USFWS

Species	Federal Status	Determination	Habitat Suitability
Northern long-eared Bat (Myotis septentrionalis)	Threatened	May affect, not likely to adversely affect	Suitable foraging and roosting habitat present on all parcels
Indiana Bat (Myotis sodalis)	Endangered	May affect, not likely to adversely affect	Suitable foraging and roosting habitat present on all parcels
Gray Bat (Myotis grisescens)	Endangered	May affect, not likely to adversely affect	Suitable foraging habitat present on all parcels.
Speckled Pocketbook (Lampsilis streckeri)	Endangered	May affect, not likely to adversely affect	Suitable habitat present on EOIs 728, 730
Rabbitsfoot (Quadrula cylindrica cylindrica)	Threatened; Critical Habitat	May affect, not likely to adversely affect	Suitable habitat present on EOIs 728, 730
Yellowcheek Darter (Etheostoma moorei)	Endangered; Critical Habitat	May affect, not likely to adversely affect	Suitable habitat present on EOIs 728, 730
Pink Mucket (Lampsilis abrupta)	Endangered	No effect	No suitable habitat present
Fat Pocketbook (Potamilus capax)	Endangered	No effect	No suitable habitat present
Scaleshell (Leptodea leptodon)	Endangered	No effect	No suitable habitat present
Bald Eagle (Haliaeetus leucocephalus)	Bald and Golden Eagle Protection Act	No effect	No suitable habitat present

3.13.2.1.1 Northern Long-eared Bat (*Myotis septentrionalis*) (Threatened)

The northern long-eared bat requires caves or mines to hibernate in during the winter. During the summer months, this species can be found roosting in caves, mines, or buildings, and under loose bark, bridges, or in hollow tree cavities from hardwoods (Foster 1999). Research has shown that during the summer months, presence and activity of the northern long-eared bat is highest in forests with late successional characteristics. Late-successional forest characteristics that seem to be important to this species includes a high percentage of old trees (>100 years), uneven forest structure, single and multiple tree fall gaps, standing snags, and woody debris (Foster 1999). These characteristics provide a high number of dead or decaying trees that can be used for breeding, summer day roosting, and foraging.

Suitable potential summer roosting and year-round, foraging habitat is available for the northern long-eared bat on the eight (8) EOIs located in Cleburne County (Table ES-1).

3.13.2.1.2 Indiana Bat (*Myotis sodalis*) (Endangered)

In the winter, the Indiana bat hibernates in caves. In the summer, habitat consists of wooded or semi-wooded areas, often but not always along streams. Maternity sites generally are behind loose bark of dead or dying trees or in tree cavities. Foraging habitats include riparian areas, upland forests, ponds, and fields, but forested landscapes are the most important habitat in agricultural landscapes. Known roost tree species include elm, oak, beech, hickory, maple, ash, sassafras, sycamore, pine, and hemlock (*Tsuga* sp.), especially trees with exfoliating bark (NatureServe 2017).

Suitable summer roosting and year-round foraging habitat is available on the eight (8) EOIs located in Cleburne County (Table ES-1) for the Indiana bat.

3.13.2.1.3 Gray Bat (*Myotis grisescens*) (Endangered)

The gray bat occurs mainly in the karst region of the eastern and central U.S. and is highly vulnerable to disturbance. Only a few caves contain most of the individuals. As a result of ongoing cave protection efforts, the total population is increasing. Each summer a colony occupies a traditional home range that often contains several roosting caves scattered along as much as 70 kilometers of river or reservoir borders. Individuals forage along rivers or shoreline up to 20 km from their roosts. Forested areas along the banks of streams and lakes provide important protection for adults and young. Young often feed and take shelter in forest areas near the entrance to cave roosts. This species does not feed in areas along rivers or reservoirs where the forest has been cleared (NatureServe 2017).

The gray bat is unlikely to roost on the eight (8) EOIs located in Cleburne County as there is little suitable habitat. However, the proposed eight (8) EOIs located in Cleburne County (Table ES-1) do provide suitable foraging habitat for the gray bat.

3.13.2.1.4 Speckled Pocketbook (*Lampsilis streckeri*) (Endangered)

The speckled pocketbook is a medium-sized (reaching approximately 80 mm in length) fresh water mussel with a thin, dark-yellow or brown shell with chevron-like spots, and chain-like rays. Like other freshwater mussels, the speckled pocketbook feeds by filtering food particles from the water column. The specific food habits of the species are unknown, but other juvenile and adult freshwater mussels have been documented to feed on detritus, diatoms, phytoplankton, and zooplankton. The diet of speckled pocketbook glochidia, like other freshwater mussels, comprises water (until encysted on a fish host) and fish body fluids (once encysted). This species is typically found in coarse to muddy sand with a constant flow of water. The speckled pocketbook is not associated with slow current, pools, or stretches of rivers with intermittent flow (NatureServe 2017).

Historically, populations occurred in Archey, Middle, and South Forks of the Little Red River in Van Buren County, Arkansas. This species has been found in recent years from the following streams in the Little Red River drainage: Archey, Beech, Middle, South, and Turkey

Forks of the Little Red River, and Big Creek. Presently, this species presence seems limited to a 19.4 km stretch of the Middle Fork of the Little Red River (NatureServe 2017).

Suitable habitat does exist for the speckled pocketbook on EOI #728 and 730 located in Cleburne County (Table ES-1).

3.13.2.1.5 Rabbitsfoot (Quadrula cylindrica cylindrica) (Threatened; Critical Habitat)

The typical habitat for the rabbitsfoot is small to medium rivers with moderate to swift currents. In smaller streams it inhabits bars or gravel and cobble close to the fast current. It is found in medium to large rivers in sand and gravel. It has been found in depths up to 3 m. Despite their streamlined appearance, specimens are more often found fully exposed lying on their sides on top of the substrate (NatureServe 2017).

The typical habitat for the rabbitsfoot is small to medium rivers with moderate to swift currents. In smaller streams it inhabits bars or gravel and cobble close to the fast current. It is found in medium to large rivers in sand and gravel. It has been found in depths up to 3 m. Blacktail shiner and rainbow darter are the primary glochidial hosts for this species (NatureServe 2017).

Suitable habitat does exist for the rabbitsfoot on EOI # 728 and 730 located in Cleburne County (Table ES-1).

3.13.2.1.6 Yellowcheek Darter (*Etheostoma moorei*) (Endangered; Critical Habitat)

The yellowcheek darter (*Etheostoma moorei*) is a small and compressed fish which attains a maximum standard length of about 64 mm (2.5 inches), has a moderately sharp snout, deep body, and deep caudal peduncle. The back and sides are grayish brown, often with darker brown saddles and lateral bars. Breeding males are brightly colored with a bright blue or brilliant turquoise breast and throat and light green belly, while breeding females possess orange and red-orange spots but are not brightly colored. First collected in 1959 from the Devils Fork tributary of the Little Red River, this species was eventually described by Raney and Suttkus in 1964, using 228 specimens from the Middle Fork, South Fork, and Devils Fork tributaries of the Little Red River. The yellowcheek darter is one of only two members of the subgenus *Nothonotus* known to occur west of the Mississippi River. The South Fork of the Little Red River is designated Critical Habitat for the yellowcheek darter (NatureServe 2017).

Suitable habitat does exist for the yellowcheek darter on EOI # 728 and 730 located in Cleburne County (Table ES-1).

3.13.2.1.7 Pink Mucket (*Lampsilis abrupta*) (Endangered)

The pink mucket is characterized as a large river species associated with fast-flowing waters, although in recent years it has been able to survive and reproduce in impoundments with river-lake conditions but never in standing pools of water. It is found in waters with strong currents, rocky or boulder substrates, with depths up to about 1 meter, but is also found in deeper waters

with slower currents and sand and gravel substrates (NatureServe 2017). Suitable habitat for the pink mucket does not exist on the proposed eight (8) EOIs located in Cleburne County (Table ES-1).

3.13.2.1.8 Fat Pocketbook (*Potamilus capax*) (Endangered)

The fat pocketbook is a freshwater mussel that prefers sand, silt, and clay habitats in flowing water. The species typically grows up to 4.5 inches in length and has a rounded, greatly inflated shell. Large rivers in slow-flowing water in mud or sand provides the optimal habitat for the fat pocketbook. The fat pocketbook lives in the St. Francis River drainage in areas ranging from small ditches to the main channel at the river's lower end. While it is listed as endangered, the fat pocketbook has a "stable" status ranking from the Arkansas Game and Fish Commission (NatureServe 2017). Suitable habitat for the fat pocketbook does not exist on the proposed eight (8) EOIs located in Cleburne County (Table ES-1).

3.13.2.1.9 Scaleshell (*Leptodea leptodon*) (Endangered)

The scaleshell is a small freshwater mussel with a thin shell and faint green streaks. It can grow up to 4 inches in length. Scaleshell mussels live in medium to large, slow to medium-flowing rivers with stable channels and good water quality. They burrow in sand and gravel on the river bottom and siphon nutrition from particles in the water, such as plant debris. Channelization and impoundment of rivers have eliminated large areas of suitable habitat. Relatively little is known regarding the life history of the scaleshell (NatureServe 2017). Suitable habitat for the scaleshell does not exist on the proposed eight (8) EOIs located in Cleburne County (Table ES-1).

3.13.2.1.10 Bald Eagle (Haliaeetus leucocephalus) (BGEPA)

The bald eagle (*Haliaeetus leucocephalus*) was officially removed from the Endangered Species List in 2007 and continues to be protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA).

Bald eagles are associated with large inland lakes, large rivers and coastal waters and use large old growth pine, bald cypress and some oak species, usually within ¼ mile of inland lakes and large rivers for nesting and loafing. Bald eagles live near where they can find fish, their staple food. Bald eagles will also feed on waterfowl, turtles, rabbits, snakes, and other small animals and carrion.

Nest sites typically include at least one perch with a clear view of the water or area where the eagles usually forage. Eagles choose the tops of large trees to build nests, which they typically use and enlarge each year. Nests may reach 100 feet across and weigh a half ton. They may also have one or more alternate nests within their breeding territory. The birds travel great distances but usually return to breeding grounds within 100 miles of the place where they were raised.

Bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. The Service developed the National Bald Eagle Management (NBEM) Guidelines in 2007 to provide landowners, land managers, and others with information and recommendations regarding how to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the

BGEPA. Under the BGEPA, "disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." A copy of the NBEM Guidelines is available at http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.

In 2016, the Service revised its regulations for incidental take permits (50 CFR§ 22.26 and § 22.27) to clarify subsequent project-level NEPA analyses associated with permit applications. Nevertheless, permittees are required to implement all practicable best management practices and other measures and practices that are reasonably likely to reduce eagle take. At the APD stage, additional surveys and consultation will be initiated if proposed oil and gas development impacts bald eagles. An example of recommended guidance from the Service to assist oil and gas operators with project evaluation and compliance with the BGEPA and the Migratory Bird Treaty Act (MBTA) is available at

 $\frac{https://www.fws.gov/southwest/es/Oklahoma/Documents/TE_Species/Oklahoma\%20Guidance\%20for\%20BGEPA\%20and\%20MBTA.pdf$

No bald eagles were observed on the tract. Although several small creeks are present on the proposed eight (8) EOIs located in Cleburne County (Table ES-1), they would not be preferred habitat for bald eagles.

3.13.2.2 Special Status Species (Stone County)

Table 3-20. List of threatened and endangered species documented to occur in Stone County by USFWS

	Federal		
Species	Status	Determination	Rationale
Northern long-eared Bat (Myotis			Suitable foraging and
_	Threatened		roosting habitat present
septentrionalis)		May affect, not likely to adversely affect	on EOI #1103
			Suitable foraging and
Indiana Bat (Myotis sodalis)	Endangered		roosting habitat present
		May affect, not likely to adversely affect	on EOI #1103
			Suitable foraging
Gray Bat (Myotis grisescens)	Endangered		habitat present on EOI
		May affect, not likely to adversely affect	#1103
Speckled Pocketbook (<i>Lampsilis streckeri</i>)	Endangered		No suitable habitat
Speckled I ockeloook (Eampsilis streckert)	Lindangered	No effect	present
Rabbitsfoot (Quadrula cylindrica	Threatened;		
cylindrica)	Critical		No suitable habitat
Cylinarica)	Habitat	No effect	present
	Endangered;		
Yellowcheek Darter (Etheostoma moorei)	Critical		No suitable habitat
	Habitat	No effect	present
Cave Crayfish (Cambarus zophonastes)	Endangered		No suitable habitat
Cave Craynsh (Cambarus zophonasies)	Endangered	No effect	present
Snuffbox (<i>Epioblasma triquetra</i>)	Endangered		No suitable habitat
Shurroox (Epiootasma iriqueira)	Endangered	No effect	present
Bald Eagle (Haliaeetus leucocephalus)	Bald and	No effect	No suitable habitat

Golden Eagle	present
Protection	
Act	

3.13.2.2.1 Northern Long-eared Bat (*Myotis septentrionalis*) (Threatened)

Preferred habitat characteristics and occurrence in Arkansas for the northern long-eared bat are described above. Stone County is located immediately north of Cleburne County and has one EOI #1103 located there. Suitable summer roosting and year-round foraging habitat is available for the northern long-eared bat on this EOI.

3.13.2.2.2 Indiana Bat (*Myotis sodalis*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the Indiana bat are described above. Suitable summer roosting and year-round foraging habitat is available for the Indiana bat on EOI #1103.

3.13.2.2.3 Gray Bat (Myotis grisescens) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the gray bat are described above. Suitable roosting habitat does not exist on EOI #1103 but does exist for foraging.

3.13.2.2.4 Speckled Pocketbook (*Lampsilis streckeri*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the speckled pocketbook are described above. Suitable habitat for the speckled pocketbook does not exist on EOI #1103 in Stone County.

3.13.2.2.5 Rabbitsfoot (Quadrula cylindrica cylindrica) (Threatened; Critical Habitat)

Preferred habitat characteristics and occurrence in Arkansas for the rabbitsfoot are described above. Suitable habitat for the rabbitsfoot does not exist on EOI #1103 in Stone County.

3.13.2.2.6 Yellowcheek Darter (*Etheostoma moorei*) (Endangered; Critical Habitat)

Preferred habitat characteristics and occurrence in Arkansas for the yellowcheek darter are described above. Suitable habitat for the yellowcheek darter does not exist on EOI #1103 in Stone County.

3.13.2.2.7 Cave Crayfish (*Cambarus zophonastes*) (Endangered)

The Hell Creek Cave crayfish is an extremely rare crustacean (total population thought to be < 50 individuals) inhabiting both in-stream and deep-water habitat in cave and karst formations. This species is a small (2.5-3.0 inch) crayfish lacking pigmentation and featuring reduced eye formation. It is known to inhabit only three (3) locations (2 caves and one spring) in the Arkansas counties of Marion and Stone. One of the cave sites has been acquired by the ANHC. This crayfish's life history and ecology is poorly understood. Although trampling of individuals

by humans has been documented, the greatest threats to the Hell Creek Cave crayfish are believed to be pollution of groundwater by contaminants or other chemical and physical factors affecting underground hydrology in cave and karst habitat (NatureServe 2017). Suitable habitat for the Hell Creek Cave crayfish does not exist on EOI #1103 in Stone County.

3.13.2.2.8 Snuffbox (*Epioblasma triquetra*) (Endangered)

Snuffbox is a small mussel federally listed as endangered. In Arkansas, it is known from two localities within the White River, a few sites in the Spring River and Strawberry River, and a single dead specimen from the Black River at the Spring River mouth. Pollution through point and non-point sources is perhaps the greatest on-going threat to this species and most freshwater mussels. This species can be found in riffles of medium and large rivers with stony or sandy bottoms, in swift currents, usually deeply buried (NatureServe 2017). Suitable habitat for the snuffbox does not exist on EOI #1103 in Stone County.

3.13.2.2.9 Bald Eagle (Haliaeetus leucocephalus) (BGEPA)

Preferred habitat characteristics and occurrence in Arkansas for the bald eagle are described above. Bald eagles will remain protected under the BGEPA, as well as the Migratory Bird Treaty Act. No bald eagles were observed on the tract. Although a small creek is present on EOI #1103 located in Stone County (Table ES-1), it would not be preferred habitat for bald eagles.

3.13.2.3 Special Status Species (Van Buren County)

Table 3-21. List of threatened and endangered species documented to occur in Van Buren County by USFWS

Species	Federal Status	Determination	Rationale
Northern long-eared Bat (Myotis septentrionalis)	Threatened		Suitable foraging and roosting habitat
		May affect, not likely to adversely affect	present on all parcels
Indiana Bat (Myotis sodalis)	Endangered	May affect, not likely to adversely affect	Suitable foraging and roosting habitat present on all parcels
Gray Bat (Myotis grisescens)	Endangered	May affect, not likely to adversely affect	Suitable foraging habitat present on all parcels
Speckled Pocketbook (Lampsilis streckeri)	Endangered	May affect, not likely to adversely affect	Suitable habitat present on EOI #s 738, 739, 743
Rabbitsfoot (Quadrula cylindrica cylindrica)	Threatened; Critical Habitat	May affect, not likely to adversely affect	Suitable habitat present on EOI #s 738, 739, 743
Yellowcheek Darter (Etheostoma moorei)	Endangered; Critical Habitat	May affect, not likely to adversely affect	Suitable habitat present on EOI #s 738, 739, 743
Bald Eagle (Haliaeetus leucocephalus)	Bald and Golden Eagle Protection Act	No effect	No suitable habitat present

3.13.2.3.1 Northern Long-eared Bat (*Myotis septentrionalis*) (Threatened)

Preferred habitat characteristics and occurrence in Arkansas for the northern long-eared bat are described above. Van Buren County is located immediately west of Cleburne County. Suitable summer roosting and year-round foraging habitat for the northern long-eared bat exists on the seven (7) EOIs located in Van Buren County (Table ES-1).

3.13.2.3.2 Indiana Bat (*Myotis sodalis*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the Indiana bat are described above. Suitable summer roosting and year-round foraging habitat for the Indiana bat exists on the seven (7) EOIs located in Van Buren County (Table ES-1).

3.13.2.3.3 Gray Bat (*Myotis grisescens*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the gray bat are described above. No known, suitable roosting habitat for the gray bat exists on the seven (7) EOIs located in Van Buren County (Table ES-1); however, these EOIs do offer year round foraging habitat for the gray bat.

3.13.2.3.4 Speckled Pocketbook (*Lampsilis streckeri*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the speckled pocketbook are described above. Suitable habitat for the speckled pocketbook does exist on three of the seven (7) EOIs located in Van Buren County (Table ES-1). These are EOI #s 738 (Archey Creek), 739 (South Fork of the Little Red River), and 743 (Archey Creek).

3.13.2.3.5 Rabbitsfoot (*Quadrula cylindrica cylindrica*) (Threatened; Critical Habitat)

Preferred habitat characteristics and occurrence in Arkansas for the rabbitsfoot are described above. Suitable habitat for the rabbitsfoot exists on three (3) of the seven (7) EOIs located in Van Buren County (Table ES-1). These are EOI #s 738 (Archey Creek), 739 (South Fork of the Little Red River), and 743 (Archey Creek).

3.13.2.3.6 Yellowcheek Darter (*Etheostoma moorei*) (Endangered; Critical Habitat)

Preferred habitat characteristics and occurrence in Arkansas for the yellowcheek darter are described above. Suitable habitat for the yellowcheek darter exists on three of the seven (7) EOIs located in Van Buren County (Table ES-1). These are EOI #s 738 (Archey Creek), 739 (South Fork of the Little Red River), and 743 (Archey Creek).

3.13.2.3.7 Bald Eagle (Haliaeetus leucocephalus) (BGEPA)

Preferred habitat characteristics and occurrence in Arkansas for the bald eagle are described above. Bald eagles will remain protected under the BGEPA, as well as the Migratory Bird Treaty Act.

No bald eagles were observed on the tract. Although one river and several medium creeks are present on the proposed seven (7) EOIs located in Van Buren County (Table ES-1), they would not be a preferred habitat for bald eagles.

3.13.2.4 Special Status Species (White County)

Table 3-22. List of threatened and endangered species documented to occur in White County by USFWS

Species	Federal Status	Determination	Rationale
Northern long-eared Bat (Myotis septentrionalis)	Threatened	May affect, not likely to adversely affect	Suitable foraging and roosting habitat present
Gray Bat (Myotis grisescens)	Endangered	May affect, not likely to adversely affect	Suitable foraging habitat present
Speckled Pocketbook (Lampsilis streckeri)	Endangered	May affect, not likely to adversely affect	Suitable habitat present
Rabbitsfoot (Quadrula cylindrica cylindrica)	Threatened; Critical Habitat	No effect	No suitable habitat present
Pink Mucket (Lampsilis abrupta)	Endangered	No effect	No suitable habitat present
Fat Pocketbook (Potamilus capax)	Endangered	No effect	No suitable habitat present
Scaleshell (Leptodea leptodon)	Endangered	No effect	No suitable habitat present
Piping Plover (Charadrius melodus)	Threatened	No effect	No suitable habitat present
Bald Eagle (Haliaeetus leucocephalus)	Bald and Golden Eagle Protection Act	No effect	No suitable habitat present

3.13.2.4.1 Northern Long-eared Bat (*Myotis septentrionalis*) (Threatened)

Preferred habitat characteristics and occurrence in Arkansas for the northern long-eared bat are described above. White County is located immediately southeast of Cleburne County. Suitable summer roosting and year-round foraging habitat for the northern long-eared bat exists on 961b, the one (1) EOI located in White County (Table ES-1).

3.13.2.4.2 Gray Bat (*Myotis grisescens*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the gray bat are described above. No known, suitable roosting habitat for the gray bat exists on the one (1) EOI located in White County (Table ES-1); however, this EOI does offer year round foraging habitat for the gray bat.

3.13.2.4.3 Speckled Pocketbook (*Lampsilis streckeri*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the speckled pocketbook are described above. Suitable habitat for the speckled pocketbook does exist on the one (1) EOI located in White County (Table ES-1).

3.13.2.4.4 Rabbitsfoot (*Quadrula cylindrica cylindrica*) (Threatened; Critical Habitat)

Preferred habitat characteristics and occurrence in Arkansas for the rabbitsfoot are described above. Suitable habitat for the rabbitsfoot does not exist on EOI #961b located in White County (Table ES-1).

3.13.2.4.5 Pink Mucket (*Lampsilis abrupta*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the pink mucket are described above. Suitable habitat for the pink mucket does not exist on EOI #961b located in White County (Table ES-1).

3.13.2.4.6 Fat Pocketbook (*Potamilus capax*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the fat pocketbook are described above. Suitable habitat for the fat pocketbook does not exist on EOI #961b located in White County (Table ES-1).

3.13.2.4.7 Scaleshell (*Leptodea leptodon*) (Endangered)

Preferred habitat characteristics and occurrence in Arkansas for the scaleshell are described above. Suitable habitat for the scaleshell does not exist on EOI #961b located in White County (Table ES-1).

3.13.2.4.8 Piping Plover (*Charadrius melodus*) (Threatened)

The piping plover is a small, stocky, shorebird with a sand-colored upper body, white underside, and orange legs. They grow up to 7 inches long and weigh just 2.25 ounces. Their food consists of worms, fly larvae, beetles, crustaceans, mollusks, and other invertebrates. The piping plover is a migratory bird which often returns to the same nesting area in consecutive years. This species lives near ocean beaches or on sand or algal flats in protected bays. It is most abundant on expansive sandflats, sandy mudflats, and sandy beach in close proximity; usually in areas with high habitat heterogeneity (NatureServe 2017).

Piping plovers are migratory shorebirds and there are records of them resting and feeding at stopover sites in Arkansas on their way between their breeding grounds in the northern Great Plains and Great Lakes region and their wintering grounds along the Coast of the Gulf of Mexico. Suitable stopover habitat includes riverine sandbars, gravel pits along rivers, mudflats from pond or lake drawdowns, and flat, wide, sparsely vegetated sand or gravel beaches (NatureServe 2017). There is a water body present on EOI #961b; however, there is no suitable stopover habitat to support the piping plover.

3.13.2.4.9 Bald Eagle (Haliaeetus leucocephalus) (BGEPA)

Preferred habitat characteristics and occurrence in Arkansas for the bald eagle are described above. Bald eagles will remain protected under the BGEPA, as well as the Migratory Bird Treaty

Act. No bald eagles were observed on the tract. Although the Little Red River is present on EOI #961b located in White County (Table ES-1), it would not be a preferred habitat for bald eagles.

3.14 Migratory Bird Species of Concern

The Migratory Bird Treaty Act of 1918 (MBTA), as amended, makes it unlawful to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, or possess any migratory bird or any part, nest, or egg of any such bird", unless expressly permitted by Federal regulations (16 U.S.C. 703(a)). Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, directs Federal agencies to integrate conservation principles, measures, and practices into authorized activities and avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources. The Service and the BLM signed a memorandum of understanding (MOU) in 2010, to promote the conservation and strategic management of migratory birds on BLM managed public lands and Federal mineral split estate lands. Measures to comply with the MBTA shall be applied to ensure protection for migratory birds and encourage conservation actions in oil and gas development activities that might otherwise adversely impact habitats.

No surface disturbance is authorized at the leasing stage and any oil and gas development activities will require additional surveys and consultation. Onshore Oil and Gas Order 7 requires that produced water pits "shall be fenced or enclosed to prevent access by livestock, wildlife, and unauthorized personnel". Additionally, the Order requires deterrents to exclude birds from open fluid pits. At the APD stage, design features, applicant committed BMPs, conservation actions, and Conditions of Approval (COAs) may be applied to provide migratory bird protections.

The BLM identified the migratory bird species in Table 3-23, including native passerines (flycatchers and songbirds), birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Among the wide variety of species protected by the MBTA, special concern is usually given to the following groups:

- Species that migrate across long distances, particularly Neotropical migrant passerines that winter in tropical or Southern Hemisphere temperate zones
- Birds of prey, which require large areas of suitable habitat for finding sufficient prey
- Species that have narrow habitat tolerances and hence are vulnerable to extirpation from an area as a result of a relatively minor habitat loss
- Species that nest colonially and hence are vulnerable to extirpation from an area as a result of minor habitat loss

Because of the many species that fall within one or more of these groups, BLM focuses on species identified by USFWS as Birds of Conservation Concern (BCC) (USDI USFWS 2008). Table 3-23 lists the BCC found in the West Gulf Coastal Plain where the proposed seventeen (17) EOIs (Table ES-1) are located. There is suitable habitat on the proposed lease parcels and surrounding area for multiple BCC on these lists.

Table 3-23. List of BCC found in the West Gulf Coastal Plain Region (EOI #).

Common Name	Scientific Name	Suitable Habitat Located on Parcel
Least Bittern	Ixobrychus exilis	No
Little Blue Heron	Egretta caerulea	No
Swallow-tailed Kite	Elanoides forficatus	No
Bald Eagle (b)	Haliaeetus leucocephalus	No
American Kestrel	Falco sparverius	Yes
Yellow Rail (nb)	Coturnicops noveboracensis	No
Solitary Sandpiper (nb)	Tringa solitaria	No
Hudsonian Godwit (nb)	Limosa haemastica	No
Buff-breasted Sandpiper (nb)	Tryngites subruficollis	No
Chuck-will's widow	Caprimulgus carolinensis	Yes
Red-headed Woodpecker	Melanerpes erythrocephalus	Yes
Loggerhead Shrike	Lanius ludovicianus	Yes
Short-eared Owl (nb)	Asio flammeus	Yes
Brown-headed Nuthatch	Sitta pusilla	Yes
Bewick's Wren (bewickii ssp.)	Thryomanes bewickii	Yes
Wood Thrush	Hylocichla mustelina	Yes
Sprague's Pipit (nb)	Anthus spragueii	No
Prairie Warbler	Dendroica discolor	Yes
Cerulean Warbler	Dendroica cerulea	Yes
Prothonotary Warbler	Protonotaria citrea	Yes
Worm-eating Warbler	Helmitheros vermivorum	Yes
Swainson's Warbler	Limnothlypis swainsonii	Yes
Louisiana Waterthrush	Parkesia motacilla	Yes
Kentucky Warbler	Oporornis formosus	Yes
Bachman's Sparrow	Peucaea aestivalis	No
Henslow's Sparrow (nb)	Ammodramus henslowii	No
Smith's Longspur	Limnothlypis swainsonii	No
Painted Bunting	Passerina ciris	Yes
Orchard Oriole	Icterus spurius	Yes

Note: (a) - ESA candidate, (b) - ESA delisted, (c) - non-listed subspecies or population of threatened or endangered species, (nb) - non-breeding in this Bird Conservation Region. Source: U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/]

3.15 Public Health and Safety

NEPA requires federal agencies to evaluate whether a Proposed Action is significant based on the "degree to which the proposed action affects public health or safety" (40 CFR 1508.27). Public health and safety is often considered within the context of other resources, such as air quality, water quality and/or quantity, environmental justice, or transportation, among others, and is typically assessed in terms of what the expected risk is to the human environment as a result of the Proposed Action. For this EA, public health and safety issues are generally considered within the boundary of the proposed lease parcel; although some issues related to public health and safety, such as air quality, requires consideration of a larger affected environment due to the potential dispersion of air emissions.

A fundamental agency value of BLM is to operate in a safe manner and to provide a safe environment for the public. This safety outlook applies to all types of projects proposed by BLM and on BLM-administered lands, including mineral development. The BLM has the responsibility along with state and local authorities to implement the appropriate measures, when needed to provide for public safety.

Onshore Oil and Gas Orders are a way in which BLM implements and supplements the oil and gas regulations found at 43 CFR 3160 for conducting oil and gas operations, particularly at the APD stage. These Onshore Orders are listed below:

- Order No. 1 Approval of Operations: This Order provides procedures for submitting an Application for Permit to Drill and all required approvals of subsequent well operations and other lease operations;
- Order No. 2 Drilling: This Order provides requirements and standards for drilling and abandonment:
- Order No. 6 Hydrogen Sulfide Operations: This Order provides the requirements and standards for conducting oil and gas operations in an environment known to or expected to contain hydrogen sulfide (H2S) gas; and
- Order No. 7 Disposal of Produced Waters: This Order provides the methods and approvals necessary to dispose of produced water associated with oil and gas operations.

3.16 Transportation

Existing roadways on the majority of proposed lease parcels are unimproved dirt and/or gravel roads for farming or forestry management. Some parcels have no road access while others are bounded by paved city, county roads or state highways. For most of these rural parcels, any increase in vehicle traffic resulting from future mineral development could potentially cause both ground and wildlife disturbance as well as an increase in noise, dust, and soil compaction.

4.0 CHAPTER 4 - ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This chapter assesses the anticipated environmental consequences associated with direct, indirect, and cumulative effects of the Proposed Action and No Action Alternative. In accordance with DOI and BLM NEPA procedures, the level of detail, scope, and complexity of analyses should be commensurate with the scale, impacts, scientific complexities, uncertainties, and other aspects (such as public concern), inherent in potential decisions. Therefore, the level of analysis presented in this EA for each resource is based on factors such as the size of the project and anticipated level of effect. The Proposed Action of leasing the parcel would, by itself, have no direct impact on any resources in the lease area since there would be no surface disturbing activities. All anticipated resource impacts would be associated with potential future oil and gas development. For the purpose of this EA, a RFD scenario is used to assess the potential impacts from reasonably foreseeable, but yet uncertain, future oil and gas development as a result of leasing the parcels. If development results from the proposed leases, short-term impacts from potential development are considered those that would be stabilized or mitigated within five years and long-term impacts are those that would substantially remain for more than five years. Cumulative impacts include the combined effect of past projects, specific planned projects and

other reasonably foreseeable future actions such as other infield wells being located within the nearby area. Cumulative impacts are addressed at the end of this Chapter.

4.1 Land Use

4.1.1 Proposed Action

There would be no direct impacts to land use as a result of leasing as there would be no surface disturbing activities at this stage. The RFD scenario developed for this EA predicts that approximately 240.14 acres of surface disturbance would occur on the proposed parcels in the future. There would likely be short and long-term changes to land use as a result of reasonably foreseeable oil and gas development on this land. Reclamation activities at the sites would result in some of the land being reverted to natural conditions over time.

4.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.2 Visual/Noise/Recreation Resources

4.2.1 Proposed Action

Under the Proposed Action, the RFD scenario projects approximately 240.14 acres of surface disturbance on seventeen (17) EOI #s (Table ES-1) as a result of reasonably foreseeable oil and gas development. Visual impacts may be short or long term, depending on when oil and gas activities commence and are completed. While the act of leasing federal minerals would produce no impacts to visual resources since there is no surface disturbing activities at this time, subsequent exploration/development could affect visual quality on adjacent lands through: increased visibility of constructed features such as roads, well pads, pipelines, and tank batteries; road degeneration from heavy trucks and vehicles following rain; dust and exhaust from construction, drilling, and production vehicles and equipment; vegetation removal; unreclaimed sites; and discarded equipment. Well pads, power lines, access roads, and associated production facilities and storage tanks have the greatest potential to alter visual conditions for the life of the well. Vegetation removal would present an obvious contrast in color with the surrounding vegetation and affect foreground and middle ground distance zones for more than a decade. These impacts would be most obvious immediately after construction. Impacts would decrease as the disturbed surface begins to blend in color, form, and texture, when interim or final reclamation occurs. Long-term visual impacts could persist as long as the well is producing, which could be a couple of years to more than 50 years. Long-term impacts may include vegetation removal, alteration of the landscape, and installation of equipment and facilities. Reclamation activities would result in some of the land being reverted to natural conditions over time.

Noise generation from well operations would be associated with vehicle movements and the operation of production equipment. There could be short-term noise impacts associated with construction, drilling, and/or completion of reasonably foreseeable oil and gas development activities on the seventeen (17) EOIs, but the intensity of the impacts would likely be minimal. Noise generating activities would lessen over time as production commences, when the site would be visited periodically and/or to haul produced fluids. There is some level of development on multiple proposed lease parcels present on the seventeen (17) EOIs; however, the majority of parcels currently have minimal development surrounding the parcel, so it is likely that few residences would be disturbed from noise associated with potential future oil and gas development from leasing the seventeen (17) EOIs.

The proposed project sites are located on and surrounded by public and private property. Likely recreational activities known to occur on and surrounding the project areas are fishing and hunting by local land owners. Fishing and hunting activities are regulated by the AGFC. Fishing and hunting activities occur only at certain times of the year by state law. Short-term impacts may occur during drilling but long-term impacts are not expected to either recreational activity.

4.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.3 Socioeconomics and Environmental Justice

4.3.1 Proposed Action

4.3.1.1 Socioeconomics

The direct effect of the Proposed Action would be the payments received, if any, from the leasing of 2766.06 acres of federal mineral estate. If the lease is sold and it leads to actual well drilling and economic production in the future, it would likely bring modest revenues in the form of royalty payments, severance taxes, and rent monies to the state and county. Economic production would provide wages and salaries to employees, maintenance staff, and contractors employed in drilling wells, and sales to area hotels, restaurants, and other businesses that serve drillers for the duration of drilling and similar construction-related benefits later as wells are abandoned and sites restored. Other effects could include the potential for increases in traffic congestion, noise and visual impacts associated with fluid mineral production.

It is speculative to predict the exact effects of this action since there is no guarantee that the leases will receive bids, and that the parcels will be developed and produce fluid minerals. Any APDs received would require additional site-specific NEPA analysis which would further examine socioeconomic impacts to the local economy. It is unknown how oil and gas surface disturbances associated with exploration and development, such as construction of roads, well pads, and other infrastructure would affect the oil and gas sector or the associated services economy in Cleburne, Stone, Van Buren, and White Counties. At this time, it is not possible to

determine the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in Cleburne, Stone, Van Buren, and White Counties, but any effects would be anticipated to be beneficial.

4.3.1.2 Environmental Justice

As seen in Section 3.3.2, Environmental Justice, there is low potential for the presesence of environmental justice populations; therefore, no disproportionate effects are anticipated as a result of the Proposed Action. The proposed leases would not create an unsafe or unhealthy environment for any population, including minority and low-income populations and therefore would not be out of conformance with EO 12898. The direct effect of the Proposed Action would be the payments received, if any, from the leasing of the 2766.06 acres of federal mineral estate. Indirect positive environmental justice effects could include potential future employment opportunities related to oil and gas and service support industries that might result, should the leases be sold and whether exploration and development of the leases occurs. It is speculative to predict the exact effects of the leasing action to human health and the environment, as sitespecific development proposals and analysis would be examined in future NEPA. The total surface disturbance estimated for this lease sale parcel based on the RFD scenario of 40 well pads is approximately 240.14 acres. Potential adverse human health or environmental effects related to oil and gas production are not quantifiable at this stage but are limited in extent as to not likely to disproportionately affect low-income or minority populations. Specific impacts to public health, such as the potential for contamination of surface waters and aquifers due to subsurface hydraulic fracturing operations are considered extremely unlikely based on the thousands of feet of rock separating target formations from underground reservoirs. Additional discussion of the effects of oil and gas operations to water quality can be found in Section 4.9. Potential impacts to water use on low income or minority populations would be analyzed in more detail at the APD stage.

4.3.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.4 Cultural Resources and Native American Concerns

4.4.1 Proposed Action

There would be no direct impacts to cultural resources or Native American interests as a result of leasing as there would be no surface disturbance at this stage. Cultural resource surveys have not been conducted on sixteen of seventeen (17) EOIs and therefore there may be undiscovered cultural resources present on or around the parcels. Literature reviews from the state historic preservation office indicate these lease parcels do not have recorded historic or cultural resources and some parcels have surveys and sites within one mile. Direct and indirect impacts from reasonably foreseeable future oil and gas development may occur to cultural resources or to a

potentially sacred Native American religious site if there is ground disturbance. Direct impacts are those such as completely destroying a site by bulldozing the area and workers picking up artifacts. Indirect impacts are those such as erosion or compaction of the soil on the site. If sites are located and recorded before ground disturbance begins, these impacts can be avoided or mitigated (see Section 4.4.3).

Consultation with the SHPO and coordination with the tribes occurred from March 8, 2017 to May 31, 2017 (Appendix B). Concurrence letters were received from SHPO from March 20, 2017 to May 31, 2017 (Appendix B). Responses were received from seven tribes from March 15, 2017 to May 31, 2017 (Table 1-1) agreeing that cultural resource studies are warranted prior to approval of any development proposals.

4.4.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. If the proposed leases are not made available and cultural resource surveys are not conducted, direct and indirect impacts may occur. Direct impacts are those such as completely destroying a site by "relic hunters" or by people picking up artifacts. Other direct impacts may be the mixing of layers in a site by plowing or the destruction of a site by land leveling. Indirect impacts are those such as after timber thinning or clear-cutting resulting in erosion of a site.

4.4.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of cultural resources. In order to protect cultural resources, a cultural resources survey is needed before ground disturbance begins. A report of the survey would be approved by the BLM and the SHPO before the APD is approved. If a known recorded site is located within the lease areas, it would be avoided up to 200 meters in order to protect these resources. If avoidance is not possible, then the appropriate mitigation measures would be identified in coordination with the SHPO. Additional consultation with the SHPO and the appropriate federally recognized Native Americans would occur before APD approval is given.

A BLM stipulation regarding cultural resources and Native American religious concerns applies to the lease parcels (Appendix A). The stipulation states that the BLM would not approve any ground disturbing activities that may affect historic properties and/or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. If currently unknown burials are discovered during development activities associated with these leases, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate Tribe/group of federally recognized Native Americans would take place.

4.5 Minerals and Mineral Development

4.5.1 Proposed Action

There would be no direct impacts to minerals from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration and oil and gas development could impact the production horizons and reservoir pressures. If production wells are established, the resources allotted to the wells would eventually be depleted. There could also be impacts to other mineral resources as a result of exploration/development through the loss of available surface or subsurface area needed to develop or access the other mineral resource overlapping the subject lease parcels. The extent of the impacts to mineral resources, if any, would be further determined once site-specific development information is available at the APD stage.

4.5.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.6 Wastes

4.6.1 Proposed Action

There would be no direct impacts due to waste generation from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration/oil and gas development could result in the introduction of hazardous and non-hazardous substances to the area. Oil and gas development activities typically generate the following wastes: (1) discharge of drilling fluids and cuttings into the reserve pits, (2) wastes generated from used lubrication oils, hydraulic fluids, and other fluids used during production of oil and gas, some of which may be characteristic or listed hazardous waste, and (3) service company wastes from exploration and production activities as well as containment of some general trash. Certain wastes unique to the exploration, development, and production of crude oil and natural gas have been exempted from Federal Regulations as hazardous waste under Subtitle C of the RCRA of 1976. The exempt waste must be intrinsic to exploration, development or production activities and cannot be generated as part of a transportation or manufacturing operation. The drilling fluids, drill cuttings, and produced waters are classified as a RCRA exempt waste, and potential drilling that could occur would not introduce hazardous substances into the environment if they are managed and disposed of properly under federal, state, and local waste management regulations and guidelines. Properly used, stored, and disposed of hazardous and non-hazardous substances greatly decreases the potential for any impact on any environmental resources. One way operators and the BLM ensure hazardous and non-hazardous substances are properly managed is through the preparation of a Spill Prevention, Control, and Countermeasure (SPCC) plan.

In hydraulic fracturing, chemical substances other than water make up a small percentage of the fluid composition; however, the very large volumes used require correspondingly large volumes of a variety of compounds. These substances range from the relatively benign to the highly toxic

at certain concentrations. In addition to these added chemicals, naturally occurring toxicants such as heavy metals, VOCs, and radioactive compounds are mobilized during extraction and return to the surface with the produced water. Of the millions of gallons of water used to hydraulically fracture a well one time, less than half of this treatment water is recovered as flowback or later production brine and in many cases recovery is < 30% (Engelder 2014). Although the risk is low, the potential exists for unplanned releases that could have effects on human health and environment. A number of chemical additives are used that could be hazardous, but are safe when properly handled according to requirements and long-standing industry practices. In addition, many of these additives are common chemicals which people regularly encounter in everyday life (GWPC 2009).

Surface spills of drilling mud and additives, hydraulic fracturing fluids and additives, flowback water, and other formation fluids can happen at a variety of points in the development and production phases. Spills that occur can span a range of different spill sizes and causes of failure at any point in the process. For example, small spills often happen as the result of poor pipe connections or leaks; large spills sometimes occur as the result of a major well blowout, but such blowouts rarely occur. Additionally, spills from some parts of the phases may be the result of human error (i.e. vehicle collisions, improper handling, improper equipment operation or installation, etc.), while others stem from equipment failure (i.e. broken pipes, torn pit liners, leading tanks, etc.) or acts of nature (Fletcher 2012). The most common cause of spills comes from equipment failure and corrosion (Wenzel 2012).

The cause of the spill, the spill size, the hazard rating of the spilled material, response time to clean up the spill and the effectiveness of the cleanup, all play a critical role in determining the overall impact on the environment. The volume of a spill can significantly vary with spill types. Pipe spills are not expected to release more than 1,000 gallons into the environment, retaining pit spills and truck spills are not expected to release more than 10,000 gallons of fluid, and blowouts are expected to cause the largest spills, with the potential to release tens of thousands of gallons into the environment. Small spills occur with greater frequency than large spills. Secondary containment or recovery for small spills would likely minimize, if not eliminate, any potential release into the environment. However, for spills on the order of several thousands of gallons of fluid, it is expected that less than half the fluid may be captured by secondary containment or recovery. The vast majority of operations do not incur reportable spills (5 gallons or more), indicating that the fluid management process can be, and usually is, managed safely and effectively (Fletcher 2012). There are several BLM standard conditions of approval (COAs) that apply at the APD stage which would reduce waste hazards (see Section 4.6.3 below).

4.6.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.6.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts from wastes. The following measures to reduce adverse impacts from wastes are common to most projects: all trash would be placed in a portable trash cage and hauled to an approved landfill, with no burial or burning of trash permitted, chemical toilets would be provided for human waste, fresh water zones encountered during drilling operations would be isolated by using casing and cementing procedures, a berm or dike would enclose all production facilities if a well is productive, and all waste from all waste streams on site would be removed to an approved disposal site. Future development activities would be regulated under the RCRA, Subtitle C regulations. Additionally, waste management requirements are included in the 12-point surface use plan and the 9-point drilling plan required for all APDs. Leaseholders proposing development would be required to have approved SPCCPs, if the applicable requirements of 40 CFR 112 are met, and comply with all requirements for reporting of undesirable events. Lease bonds would not be released until all facilities have been removed, wells are plugged, and satisfactory reclamation has occurred.

There are five standard BLM COAAs that would apply at the APD stage regarding handling and disposing of wastes, should federal minerals be accessed. These COAs include: storing wastes properly to minimize the potential for spills, providing secondary containment for all stored containers, draining the reserve pit before closure and trucked to a disposal site, use of preventative measures to avoid drainage of fluids, sediments, and other contaminants from the pad into water bodies, and keeping the project area clear of trash.

Further, if shallow groundwater is expected or encountered at the project specific site, open reserve pits would not be authorized and all waste products would be hauled from the site to state-approved disposal facilities.

4.7 Soils

4.7.1 Proposed Action

While the act of leasing federal minerals would not affect soils, subsequent exploration/development may produce short and long-term impacts by physically disturbing the topsoil and exposing the substratum soil on subsequent project areas. Direct impacts from reasonably foreseeable oil and gas construction of well pads, access roads, and reserve pits include: removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of topsoil productivity and susceptibility to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust from vehicle traffic during all phases of development. Vehicle traffic would be limited to approved travel routes in which the surface has not been paved or dressed in a material to prevent soil movement. The extent of wind erosion related to vehicle traffic would depend on a number of factors including: length of well bore, whether hydraulic fracturing is used during completion, whether telemetry is used during production, and whether the well is gas, oil, condensate, or a combination thereof. These impacts could result in increased indirect impacts such as runoff, erosion and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation on well sites, access roads, gas pipelines and facilities.

Additional soil impacts associated with future development can occur when heavy precipitation causes water erosion damage. When water saturated segment(s) on the access road become impassable, vehicles may still be driven over the road. Consequently, deep tire ruts may develop. Where impassable segments are created from deep rutting, unauthorized driving may occur outside the designated route of access roads.

Contamination of soil from future drilling, hydraulic fracturing, and production wastes mixed into soil or spilled on the soil surface could cause a long-term reduction in site productivity. Contaminants spilled on soil would have the potential to pollute and/or change the soil chemistry (see also Section 4.6, Wastes). These impacts can be reduced or avoided through proper design, construction, maintenance and implementation of Best Management Practices (BMPs) and COAs as described below in Section 4.7.3.

4.7.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.7.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts to soils. The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. During the life of the development, all disturbed areas not needed for active support of production operations should undergo "interim" reclamation in order to minimize the environmental impacts of development on other resources and used. Upon abandonment of wells and/or when access roads are no longer in service, final reclamation would be implemented.

The impact to the soil would be remedied upon reclamation of well pads when the stockpiled soil that was specifically conserved to establish a seed bed is spread over well pads and vegetation reestablishes. A permanent vegetation cover would be established on all disturbed areas. Road construction requirements and regular maintenance would alleviate potential impacts to access roads from water erosion damage.

Fluid impermeable containment systems (i.e. liners, dikes, berms) would be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to completely prevent solid contamination (e.g. liners) at the site or prevent the spill from going beyond the immediate site (e.g. dikes, berms).

A standard BLM COA would apply at the APD stage, should federal minerals be accessed, which would require the operator to take necessary measures to ensure that the final graded slopes are stabilized to prevent the movement of soil from the pad area for the life of the project.

Stabilization techniques could include: natural, organic matting, silt fences, and or additional mulching.

4.8 Air Resources

4.8.1 Air Quality

4.8.1.1 Proposed Action

The administrative act of offering the proposed lease parcels would have no direct impacts on air quality. Any potential effects to air quality would occur if and when the leases were developed. Any proposed development project would be subject to additional analysis of possible air effects before approval and the analysis may include air quality modeling. A Memorandum of Understanding between the Departments of the Interior and Agriculture and USEPA directs that air quality modeling be conducted for actions that meet certain emissions or geographic criteria:

- Creation of a substantial increase in emissions
- Material contribution to potential adverse cumulative air quality impacts
- Class I or sensitive Class II Areas
- Non-attainment or maintenance area
- Area expected to exceed NAAQS or PSD increment

The project areas include no Class I, sensitive Class II, or non-attainment areas. Due to the small number of wells projected to follow a lease on the lease tract in relation to the current volume of hydrocarbon, development of the leases is not likely to exceed the emissions criteria, NAAQS or PSD increment.

The following source of emissions are anticipated during any oil and gas exploration or development: combustion engines (i.e. fossil fuel fired internal combustion engines used to supply electrical or hydraulic power for hydraulic fracturing to drive the pumps and rigs used to drill the well, drill out the hydraulic stage plugs and run the production tubing in the well; generators to power drill rigs, pumps, and other equipment; compressors used to increase the pressure of the oil or gas for transport and use; and tailpipe emissions from vehicles transporting equipment to the site), venting (i.e. fuel storage tanks vents and pressure control equipment), mobile emissions (i.e. vehicles bringing equipment, personnel, or supplies to the location) and fugitive sources (i.e. pneumatic valves, tank leaks, and dust). A number of pollutants associated with combustion of fossil fuels are anticipated to be released during drilling including: CO, NOx, SO₂, Pb, PM, CO₂, CH₄, and N₂O. Venting may release VOC/HAP, H₂S, and CH₄. Mobile source emissions are likely to include fugitive particulate matter from dust or inordinate idling.

The actual emissions of each pollutant is entirely dependent on the factors described in the previous paragraph. During the completion phase, the most significant emissions of criteria pollutants emitted by oil and gas operations in general are VOCs, particulate matter and NO₂. VOCs and NOx contribute to the formation of O₃. The USEPA's Natural Gas STAR Program is a voluntary program that identifies sources of fugitive CH₄ and seeks to minimize fugitive CH₄ through careful tuning of existing equipment and technology upgrades. Data provided by STAR

show that some of the largest air emissions in the natural gas industry occur as natural gas wells that have been fractured and are being prepared for production. During well completion, flowback, fracturing fluids, water, and reservoir gas come to the surface at high velocity and volume. This mixture includes a high volume of VOCs and CH₄, along with air toxins such as benzene, ethylbenzene, and n-hexane. The typical flowback process lasts from 3 to 10 days. Pollution also is emitted from other processes and equipment during production and transportation of the oil and gas from the well to a processing facility.

To reasonably quantify emissions associated with well exploration and production activities, certain types of information are needed. Such information includes a combination of activity data such as:

- The number, type, and duration of equipment needed to construct/reclaim, drill and complete (e.g. belly scrapers, rig, completions, supply trucks, compressor, and production facilities)
- The technologies which may be employed by a given company for drilling any new wells to reduce emissions (e.g. urea towers on diesel powered drill rigs, green completions, and multi-stage flares)
- Area of disturbance for each type of activity (e.g. roads, pads, pipelines, electrical lines, and compressor station)
- Compression per well (sales and field booster), or average horsepower for each type of compressor
- The number and type of facilities utilized for production

Air pollution can affect public health in many ways. Numerous scientific studies have linked air pollution to a variety of health problems including: (1) aggravation of respiratory and cardiovascular disease, (2) decreased lung function, (3) increased frequency and severity of respiratory symptoms such as difficulty breathing and coughing, (4) increased susceptibility to respiratory infections, (5) effects on the nervous system, including the brain, such as IQ loss and impacts on learning, memory, and behavior, (6) cancer, and (7) premature death. Some sensitive individuals appear to be at greater risk for air pollution-related health effects, for example, those with pre-existing heart and lung diseases (e.g., heart failure/ischemic heart disease, asthma, emphysema, and chronic bronchitis), diabetics, older adults, and children.

Degradation of air quality may also contribute damage to ecosystem resources. For example, ozone can damage vegetation, adversely impacting the growth of plants and trees. These impacts can reduce the ability of plants to uptake CO_2 from the atmosphere and can then indirectly affect the larger ecosystems.

4.8.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.8.1.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM encourages industry to incorporate and implement BMPs, which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include:

- Flared hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion
- Watering dirt roads during periods of high use to reduce fugitive dust emissions
- Co-location wells and production facilities to reduce new surface disturbance
- Implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores
- Requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored
- Performing interim reclamation to reclaim areas of the pad not required for production facilities and to reduce the amount of dust from the pads

Additionally, the BLM encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions.

In October 2012, USEPA promulgated air quality regulations for completion of hydraulically fractured gas wells. These rules require air pollution mitigation measures that reduce the emissions of VOCs during gas well completions. Mitigation includes a process known as "Green Completion" in which natural gas brought up during flowback must be recaptured and rerouted into the gathering line. In addition, at the APD stage, the BLM would encourage operators to participate in the voluntary STAR program.

4.8.2 GHGs and Climate

4.8.2.1 Proposed Action

The administrative act of leasing the proposed federal minerals would not result in any direct GHG emissions; however, potential future development of the proposed leases may contribute to the installation and production of new wells, which may consequently lead to an increase in GHG emissions.

Many aspects of oil and gas production emit GHGs. The primary aspects include the following:

• Fossil fuel combustion for construction and operation of oil and gas facilities which include vehicles driving to and from production sites, engines that drive drill rigs, etc. These produce CO₂ in quantities that vary depending on the age, types, and conditions of the equipment as well as the targeted formation, locations of wells with respect to processing facilities and pipelines, and other site-specific factors.

- Fugitive CH₄ is CH₄ that escapes from wells (both gas and oil), oil storage, and various types of processing equipment. This is a major source of global CH₄ emissions. These emissions have been estimated for various aspects of the energy sector, and starting in 2011, producers are required under 40 CFR 98, to estimate and report their CH₄ emissions to the USEPA.
- It is expected that drilling will produce marketable quantities of oil and/or gas. Most of these products will be used for energy, and the combustion of the oil and/or gas would release CO₂ into the atmosphere. Fossil fuel combustion is the largest source of global CO₂.

The assessment of GHG emissions, their relationship to global climatic patterns, and the resulting impacts is an ongoing scientific process. The inconsistency in results of scientific models designed to predict changes in climate on regional or local scales, limits the ability to assess the significance of any discrete amount of GHG emissions on global climate. When further information is available, such information would be incorporated in the BLM's planning and NEPA documents as appropriate.

4.8.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.9 Water Resources - Surface/Ground Water

While the act of leasing federal minerals would produce no impacts to water resources, subsequent exploration and development of the lease parcels have the potential to produce impacts. The physical effects of mineral extraction include erosion, compaction, sedimentation, and potential groundwater contamination. Sedimentation and pollution of streams or wetlands can occur down-gradient from such activity sites (USDA 1999). Surface disturbance from the construction of well pads, access roads, pipelines, and utility corridors can result in degradation of surface water and groundwater quality from non-point source pollution, increased soil losses, and increased erosion.

4.9.1 Surface Water Resources

4.9.1.1 Proposed Action

Potential impacts to surface water that may occur from construction of well pads, access roads, fracturing ponds, pipelines, utility lines and production include:

- Increased surface runoff and off-site sedimentation brought about by soil disturbance
- Increased salt loading and water quality impairment of surface waters

• Channel morphology changes due to road and pipeline crossings and possible contamination of surface waters by spills

The magnitude of these impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, amount of local precipitation, soil character, and duration and time before implementation mitigation or clean up measures can be put into place.

Minor long-term direct and indirect impacts to the watershed could occur from water discharge from roads, road ditches, and well pads, but would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and powerlines have taken place. Interim reclamation of the portion of the well pad not needed for production operation, re-vegetating the portion of the pad that is needed for production operations, and re-vegetating road ditches would reduce this long-term impact. Short-term direct and indirect impacts to the watershed from future access roads that are not surfaced with impervious materials would occur and would likely decrease in time due to reclamation efforts.

4.9.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.9.1.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM will closely analyze areas proposed for drilling in APDs during the onsite inspection, since regional wetland inventories often do not capture small wetlands. USEPA requires that Storm Water Pollution Prevention Plans and SPCCP be in place to prevent any spill from reaching surface water due to rain events or accidental release of fluids related to production operations.

A BLM freshwater aquatic habitat stipulation is attached to sixteen EOIs (630, 726, 728, 730, 733, 738, 739, 743, 961b, 1086, 1103, 1148, 1174, 1469, 1770, 1773) (Table ES-1). Due to the presence of multiple parcels in some EOIs, not every parcel in each EOI has aquatic habitat present. The stipulation states that to protect the water quality of watersheds and natural stream substrate and morphology and to avoid potential impacts to aquatic species and their habitat, no surface occupancy or disturbance, including discharges, are permitted within 250 feet of a river, stream, wetland spring, headwater, wet meadow, wet pine savanna, pond, tributary, lake, coastal slough, sand bar, vernal pools, calcareous seepage marsh, or small, marshy calcareous stream. If the slope exceeds 10 percent, the buffer may be extended to 600 feet to provide adequate protection for aquatic habitats and associated species.

Regardless of buffer width, appropriate sediment and erosion control BMPs should be implemented as defined in the following USFWS documents: (1) Arkansas Best Management

Practices for Fayetteville Shale Natural Gas Activities (2007) and (2) Arkansas Best Management Practices for Natural Gas Pipeline Construction and Maintenance Activities in the Fayetteville Shale Area – Upper Little Red River Watershed (2009). These BMP documents can be found at https://www.fws.gov/arkansas-es/docs/.

An exception may be granted if the operator agrees to 1) span creeks, rivers, wetlands, and floodplains by attaching pipelines to bridges; 2) directionally drill wells and pipelines from upland sites under creeks, rivers, other waters, and wetlands or 3) implement other measures developed in consultation with USFWS and in coordination with State agencies. A modification may be approved and the buffer reduced if the adjacent waterway has been surveyed for 100 yards upstream and 300 yards downstream of the site, and the results document the lack of suitable/occupied/critical habitat for listed species which may be affected by the project, as determined by the BLM and USFWS.

4.9.2 Ground Water Resources

4.9.2.1 Proposed Action

Groundwater can be affected by multiple factors, including industrial, domestic, or agricultural activities through withdrawal, injection (including chemical injection), or mixing of materials from different geologic layers or the surface. Withdrawal of groundwater could affect local groundwater flow patterns and create changes in the quality or quantity of the remaining groundwater. Loss of a permitted source of groundwater supply due to drawdown would be considered a significant impact if it were to occur and any potential for this to occur would be assessed at the development stage should development be proposed. The drilling of horizontal wells, versus directional and vertical wells may initially appear to require a greater volume of water for drilling/completion purposes. However, a horizontal well develops a much larger area of the reservoir than a directional and/or vertical well and actually results in a lesser volume of fluids being required. Vertical and directional wells can easily require one well per 10 acres resulting in 64 wells per section. This is in contrast to one horizontal well per 640 acres or one per 320 acres which results in a net decrease in total fluid volumes needed and in surface disturbance acreages. Impacts to the quality of groundwater from future development, should they occur, would likely be limited to near a well bore location due to inferred groundwater flow conditions in the area of the parcel.

Oil and gas contained in geologic formations is often not under sufficient hydraulic pressure to flow freely to a production well. The formation may have low permeability or the area immediately surrounding the well may become packed with cuttings. A number of techniques are used to increase or enhance the flow. They include hydraulic fracturing and acid introduction to dissolve the formation matrix and create larger void space(s). The use of these flow enhancement techniques and secondary recovery methods result in physical changes to the geologic formation that will affect the hydraulic properties of the formation. Typically, the effects of these techniques and methods are localized to the area immediately surrounding the individual well, are limited to the specific oil and gas reservoir, and do not impact adjacent aquifers.

In recent years there has been an elevated public concern about the possibility of subsurface hydraulic fracturing operations creating fractures that extend well beyond the target formation to water aquifers, allowing CH₄, contaminants naturally occurring in formation water, and fracturing fluids to migrate from the target formation into drinking water supplies (Zoback et al 2010). Typically, thousands of feet of rock, including some impermeable, separate most major formations in the United States from the base of aquifers that contain drinkable water (U.S. Department of Energy, 2009). The direct contamination of underground sources of drinking water from fractures created by hydraulic fracturing would require hydrofractures to propagate several thousand feet beyond the upward boundary of the target formations through many layers of rock. It is extremely unlikely that the fractures would ever reach fresh water zones and contaminate freshwater aquifers (Zoback et al 2010). During the APD review, the exact difference between the base of treatable water and the top of the target formation for the specific site would be reviewed to determine the potential for direct contamination of underground sources.

Contamination of groundwater could occur without adequate cementing and casing of a well bore. For fracturing fluid to escape the wellbore and affect the usable quality water or contaminate or cross contaminate aquifers, the fluid would have to breech several layers of steel casing and cement. Failure of the cement or casing surrounding the wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, fracturing fluids, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling and hydraulic fracturing, allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination.

Casing specifications are designed and submitted to the BLM. The BLM independently verifies the casing program, and the installation of the casing and cementing operations are witnessed by a Petroleum Engineer. Petroleum products and other chemicals used in the drilling and/or completion process could result in groundwater contamination through a variety of operational sources including but not limited to pipeline and well casing failure, well (gas and water) construction, and spills. Similarly, improper construction and management of reserve and evaporation pits could degrade ground water quality through leakage and leaching.

The potential for negative impacts to groundwater caused from completion activities such as hydraulic fracturing have not been confirmed but based on its history of use are not likely. A recent study completed on the Pinedale Anticline did not find a direct link to known detections of petroleum hydrocarbons to the hydraulic fracturing process. Authorization of the proposed project would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection and the BLM would deny any APD who proposed drilling and/or completion process was deemed to not be protective of usable water zones as required by 43 CFR 3162.5-2(d).

A high risk of fluid migration exists along the vertical pathways created by inadequately constructed wells and unplugged inactive wells. Brine or hydrocarbons can migrate to overlying or underlying aquifers in such wells. Since the 1930s, most States have required that multiple

barriers be included in well construction and abandonment to prevent migration of injected water, formation fluids, and produced fluids. These barriers include (1) setting surface casing below all known aquifers and cementing the casing to the surface, and (2) extending the casing from the surface to the production or injection interval and cementing the interval. Barriers that can be used to prevent fluid migration in abandoned wells include cement or mechanical plugs. They should be installed (1) at points where the casing has been cut, (2) at the base of the lowermost aquifer, (3) across the surface casing shoe, and (4) at the surface. Individual States, and the BLM have casing programs for oil and gas wells to limit cross contamination of aquifers.

Impacts of water use for oil and gas development and production depend on local water availability and competition for water from other users. Overall, impacts range from declining water levels at the regional or local scales and related decreases in base flow to streams (Nicot & Scanlon, 2012). Water supplied for hydraulic fracturing could come from surface or groundwater sources. If surface water is used, there could be a temporary decrease in the source's water levels depending upon the conditions at the time of withdrawal. The time it takes to return to baseline conditions is dependent on the amount of rainfall received and other competing uses of the resource.

Typically when groundwater is used as a source of drilling/completion water, impacts to the aquifer would be minimal due to the size of the aquifers impacted and recharge potential across the entire aquifer. However, localized aquifer effects could be expected depending upon the rate of drawdown and the density and/or intensity of the drilling activity. A cone of depression may occur in the immediate vicinity of the existing water well used to supply the drilling/completion water. With each rain event, the aquifer is expected to recharge to some degree, but it is unknown if or when it would recharge to baseline conditions after pumping ceases which is dependent upon surface conditions (whether impervious surface or not). The time it takes depends greatly on rainfall events, surface soil materials, drought conditions, and frequency of pumping that has already occurred and will continue to occur into the future. The amount of water actually used for drilling/completion activities is highly dependent on a number of factors including: length of well bore, closed-loop or reserve pit drilling system, type of mud, whether hydraulic fracturing would be used during stimulation, whether recycled water would be used, dust abatement needs, and type and extent of construction, to name a few. The impacts of water use on water quality and quantity would be analyzed in more detail during the APD review.

Any proposed drilling/completion activities would need to comply with Onshore Order #2, 43 CFR 3160 regulations, and not result in a violation of a federal and/or state law. If these conditions were not met, the proposal would be denied.

4.9.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.9.2.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM recommends that fluid impermeable containment systems (i.e. liners, dikes, berms) be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to prevent chemicals from penetrating the soil and impacting the aquifer or from moving off-site to a surface water source.

4.10 Wetlands/Riparian Areas/Floodplains

4.10.1 Proposed Action

While the act of leasing federal minerals would produce no direct impacts to wetland/riparian areas/floodplains, these areas could be adversely impacted by subsequent mineral development (drilling, hydraulic fracturing, production, et.) by changing the water quality or quantity (chemical spills, storm water runoff, etc.). The seventeen (17) proposed parcels lie within both the White River and the North, Middle, Devils, and South Forks of the Little Red River floodplains, near numerous creeks (Choctaw, Little Bayou, Clifty, Panther Skin, Iron Spring, North Fork Cadron, Archey, Wild Goose) and branches (Five, Hurricane, and Bradley). Potential affects to these areas are the same as those described in Section 4.9.1, Surface Water.

4.10.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.10.3. Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

To protect the water quality of watersheds and natural stream substrate and morphology and to avoid potential impacts to aquatic species and their habitat, the BLM stipulation regarding freshwater aquatic habitat applies to sixteen (16) EOIs found in Table ES-1 (630, 726, 728, 730, 733, 738, 739, 743, 961b, 1086, 1103, 1148, 1174, 1469, 1770, 1773) in this lease and would protect the water bodies located on these parcels (Appendix A).

4.11 Invasive/Exotic Species

4.11.1 Proposed Action

While the act of leasing federal minerals would not contribute to the spread or control of invasive or non-native species, subsequent exploration/development may. Any surface disturbance could establish new populations of invasive non-native species, although the probability of this happening cannot be predicted using existing information. Noxious weed seeds can be carried to and from the project areas by construction equipment, the drilling rig and transport vehicles. At the APD stage, BLM requirements for use of weed control strategies would minimize the potential for the spread of these species.

4.11.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.11.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Specific mitigation measures would be identified at the APD stage once site-specific development plans are determined. BMPs require that all federal actions involving surface disturbance or reclamation take reasonable steps to prevent the introduction or spread of noxious weeds, including requirements to use weed-free hay, mulch and straw. A BLM COA as well as a Lease Notice (Appendix A) applies to all APDs, should federal minerals be accessed, which recommends that native cover plants in seeding mixtures be used during reclamation activities. Post-construction monitoring for cogon grass and other invasive plant species should be conducted to ensure early detection and control. If invasive species are found, the proper control techniques should be used to either eradicate the species from the area or minimize its spread to other areas. If cogon grass is found on site, equipment should be washed before exiting the site to prevent the spread of this highly invasive species to other locations.

4.12 Vegetation and Wildlife

4.12.1 Proposed Action

There would be no direct impacts to vegetation and wildlife from leasing, since there is no surface disturbance at this stage; however, reasonably foreseeable oil and gas development could result in short and long term impacts to vegetation and wildlife on the seventeen (17) EOIs. Short-term impacts to vegetation from future development would primarily result from removal of vegetation for construction of well pads and associated infrastructure. Long-term vegetation loss could include those portions of the well pad needed for production operations for the life of the well and access road.

Impacts to wildlife could result from increased habitat fragmentation, noise, or other disturbance during development. Although reclamation and restoration efforts for surface disturbance could provide for the integrity of other resources, these efforts may not always provide the same habitat values (e.g. structure, composition, cover, etc.). Short-term negative impacts to wildlife would occur during the construction and production phase of the operation (drilling, fracturing, production, etc.) due to noise and habitat destruction. In general, most wildlife species would become habituated to the new facilities. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic, noise and equipment maintenance. The magnitude of above effects would be dependent on the rate and location of the oil and gas development, but populations could likely not recover to pre-disturbance levels until the activity was completed and vegetative community restored.

Many of the common species expected to occur on the lease parcels have broad habitat requirements and would continue to be found in a variety of habitats in the surrounding areas. Wildlife use of the site after the well is put into production would vary depending on vegetation and succession stage. Once put into production, the well pad would be reduced in size and the reserve pit would be graded and seeded. The producing well site would be subject to regular maintenance and inspection. Wildlife use of the site is dependent on the adequacy of restoration. However, over the life of the well, some of the acreage would be excluded from utilization by most wildlife species.

4.12.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.12.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. Prior to authorization, activities would be evaluated on a case-by-case basis, and the project would be subject to mitigation measures. Mitigation could potentially include rapid re-vegetation, noise restrictions, project relocation, or pre-disturbance wildlife species surveying.

A standard BLM COA and Lease Notice for Perching and Nesting Birds and Bats (Appendix A) would apply at the APD stage that is designed to prevent bat and bird mortality, should federal minerals be accessed. The COA states that all open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units, and to the extent practical, to discourage birds from perching on the stacks. Installing cone-shaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

4.13 Special Status Species

4.13.1 Proposed Action

There would be no direct impacts to special status species from leasing, since there is no surface disturbance at this stage; however, reasonably foreseeable oil and gas development could result in short and long-term impacts to federally listed species on seventeen (17) EOIs. Tables 4-1, 4-2, 4-3, and 4-4 list BLM effect determinations for these species and rationale for those determinations.

Table 4-1. BLM effect determinations for species documented by USFWS to occur in Cleburne County, Arkansas.

Species	Federal Status	Determination	Rationale
Northern long-eared Bat (Myotis	Threatened	May affect, not likely to adversely	Suitable foraging

septentrionalis)		affect	and roosting habitat
			present on all
			parcels
			Suitable foraging
Indiana Dat (Mustia as dalis)	En don consid		and roosting habitat
Indiana Bat (Myotis sodalis)	Endangered	May affect, not likely to adversely	present on all
		affect	parcels
			Suitable foraging
Gray Bat (Myotis grisescens)	Endangered	May affect, not likely to adversely	habitat present on
		affect	all parcels
			Suitable habitat
Speckled Pocketbook (Lampsilis streckeri)	Endangered	May affect, not likely to adversely	present on EOI
		affect	#728 and 730
	Threatened;		Suitable habitat
Rabbitsfoot (Quadrula cylindrica cylindrica)	Critical Habitat	May affect, not likely to adversely	present on EOI
	Critical Habitat	affect	#728 and 730
	Endangered;		Suitable habitat
Yellowcheek Darter (Etheostoma moorei)	Critical Habitat	May affect, not likely to adversely	present on EOI
	Citical Habitat	affect	#728 and 730
Pink Mucket (Lampsilis abrupta)	Endangered		No suitable habitat
This Mucket (Eumpstits doruptu)	Endangered	No effect	present
Fat Pocketbook (<i>Potamilus capax</i>)	Endangered		No suitable habitat
Tat Focketoook (Folumitus capax)	Endangered	No effect	present
Scaleshell (Leptodea leptodon)	Endangered		No suitable habitat
Scalesticii (Leptoueu teptouoti)		No effect	present
	Bald and		
Bald Eagle (Haliaeetus leucocephalus)	Golden Eagle		No suitable habitat
	Protection Act	No effect	present

On eight (8) EOIs in Cleburne County, Arkansas, there is suitable foraging habitat for the northern long-eared bat, Indiana bat, and the gray bat and also suitable roosting habitat for the northern long-eared and Indiana bat. BLM has determined that reasonably foreseeable oil and gas development that could occur on eight (8) EOIs in Cleburne County, Arkansas may affect, but is not likely to adversely affect the northern long-eared, Indiana, and gray bats. On two (2) EOIs in Cleburne County, Arkansas, suitable habitat exists for the speckled pocketbook and rabbitsfoot freshwater mussels, and the yellowcheek darter. These EOIs are 728 (Panther Skin and Clifty Creeks) and 730 (Wild Goose Creek). BLM has determined that reasonably foreseeable oil and gas development that could occur on two (2) EOIs in Cleburne County, Arkansas may affect but is not likely to adversely affect the speckled pocketbook and rabbitsfoot freshwater mussels and the yellowcheek darter. BLM has determined that reasonably foreseeable oil and gas development would have no effect on the pink mucket, fat pocketbook, and scaleshell due to a lack of suitable habitat. No official determination is being made for the bald eagle due to the species being delisted although protection will still be afforded by the MBTA and BGEPA.

Table 4-2. BLM effect determinations for species documented by USFWS to occur in Stone County, Arkansas.

Species	Federal Status	Determination	Rationale
Northern long-eared Bat (Myotis septentrionalis)	Threatened		Suitable foraging
			and roosting habitat
		May affect, not likely to adversely	present on EOI
		affect	#1103
Indiana Bat (Myotis sodalis)	Endangered	May affect, not likely to adversely	Suitable foraging
		affect	and roosting habitat

			present on EOI #1103
Gray Bat (Myotis grisescens)	Endangered	May affect, not likely to adversely affect	Suitable foraging habitat present on EOI #1103
Speckled Pocketbook (Lampsilis streckeri)	Endangered	No effect	No suitable habitat present on EOI #1103
Rabbitsfoot (Quadrula cylindrica cylindrica)	Threatened; Critical Habitat	No effect	No suitable habitat present on EOI #1103
Yellowcheek Darter (Etheostoma moorei)	Endangered; Critical Habitat	No effect	No suitable habitat present on EOI #1103
Cave Crayfish (Cambarus zophonastes)	Endangered	No effect	No suitable habitat present on EOI #1103
Snuffbox (Epioblasma triquetra)	Endangered	No effect	No suitable habitat present on EOI #1103
Bald Eagle (Haliaeetus leucocephalus)	Bald and Golden Eagle Protection Act	No effect	No suitable habitat present on EOI #1103

BLM has determined that reasonably foreseeable oil and gas development that could occur on EOI #1103 in Stone County, Arkansas may affect, but is not likely to adversely affect the northern long-eared, Indiana, and gray bats due to the presence of foraging habitat for all three bat species and roosting habitat for the northern long-eared and Indiana bats. BLM has determined that reasonably foreseeable oil and gas development would have no effect on the speckled pocketbook, rabbitsfoot, and snuffbox freshwater mussels, the yellowcheek darter, and the cave crayfish due to a lack of suitable habitat on EOI #1103. No official determination is being made for the bald eagle due to the species being delisted although protection will still be afforded by the MBTA and BGEPA.

Table 4-3. BLM effect determinations for species documented by USFWS to occur in Van Buren County, Arkansas.

Species	Federal Status	Determination	Rationale
Northern long-eared Bat (Myotis septentrionalis)	Threatened	May affect, not likely to adversely	Suitable foraging and roosting habitat present on all
Indiana Bat (Myotis sodalis)	Endangered	May affect, not likely to adversely affect	Suitable foraging and roosting habitat present on all parcels
Gray Bat (Myotis grisescens)	Endangered	May affect, not likely to adversely affect	Suitable foraging habitat present on all parcels
Speckled Pocketbook (Lampsilis streckeri)	Endangered	May affect, not likely to adversely affect	Suitable habitat present on EOI # 738, 739, 743
Rabbitsfoot (Quadrula cylindrica cylindrica)	Threatened; Critical Habitat	May affect, not likely to adversely affect	Suitable habitat present on EOI # 738, 739, 743

Yellowcheek Darter (Etheostoma moorei)	Endangered; Critical Habitat	May affect, not likely to adversely affect	Suitable habitat present on EOI # 738, 739, 743
Bald Eagle (Haliaeetus leucocephalus)	Bald and Golden Eagle		No suitable habitat
	Protection Act	No effect	present

On seven (7) EOIs in Van Buren County, Arkansas, there is suitable foraging habitat for the gray bat, Indiana bat and northern long-eared bat and also suitable roosting habitat for the northern long-eared and Indiana bat. On three (3) of the seven (7) EOIs in Van Buren County, Arkansas, there is suitable habitat existing for the speckled pocketbook and rabbitsfoot freshwater mussels and the yellowcheek darter. These EOIs are 738 (Archey Creek), 739 (South Fork of the Little Red River), and 743 (Archey Creek). BLM has determined that reasonably foreseeable oil and gas development that could occur on the seven (7) EOIs in Van Buren County, Arkansas may affect, but is not likely to adversely affect the northern long-eared, Indiana, and gray bats. BLM has determined that reasonably foreseeable oil and gas development that could occur on three (3) EOIs in Van Buren County, Arkansas may affect, but is not likely to adversely affect speckled pocketbook and rabbitsfoot freshwater mussels, and the yellowcheek darter. No official determination is being made for the bald eagle due to the species being delisted although protection will still be afforded by the MBTA and BGEPA.

Table 4-4. BLM effect determinations for species documented by USFWS to occur in White County, Arkansas.

Species	Federal Status	Determination	Rationale
			Suitable foraging
Northern long-eared Bat (Myotis	Threatened	M. (66 of mar 121 of mar 1 mar)	and roosting habitat
septentrionalis)		May affect, not likely to adversely affect	present on EOI # 961b
		uncet	Suitable foraging
Gray Bat (Myotis grisescens)	Endangered	May affect, not likely to adversely	habitat present on
		affect	EOI # 961b
			Suitable habitat
Speckled Pocketbook (Lampsilis streckeri)	Endangered	May affect, not likely to adversely	present on EOI
		affect	#961b No suitable habitat
Rabbitsfoot (Quadrula cylindrica cylindrica)	Threatened;		present on EOI
Rabbits100t (Quadrud Cylinarica Cylinarica)	Critical Habitat	No effect	#961b
			No suitable habitat
Pink Mucket (Lampsilis abrupta)	Endangered		present on EOI
		No effect	#961b
	Endangered		No suitable habitat
Fat Pocketbook (Potamilus capax)		NI CC 4	present on EOI
		No effect	#961b No suitable habitat
Scaleshell (Leptodea leptodon)	Endangered		present on EOI
Scalestich (Leptoded teptodon)	Lindangered	No effect	#961b
Piping Plover (Charadrius melodus)	Threatened		No suitable habitat
			present on EOI
		No effect	#961b
	Bald and		No suitable habitat
Bald Eagle (Haliaeetus leucocephalus)	Golden Eagle		present on EOI
	Protection Act	No effect	#961b

BLM has determined that reasonably foreseeable oil and gas development that could occur on EOI #961b in White County, Arkansas may affect, but is not likely to adversely affect the northern long-eared and gray bat due to the presence of suitable foraging habitat for both bat species and roosting habitat for the northern long-eared bat. BLM has determined that reasonably foreseeable oil and gas development that could occur on EOI #961b in White County, Arkansas may affect, but is not likely to adversely affect the speckled pocketbook freshwater mussel due to suitable habitat in the Little Red River. BLM has determined that reasonably foreseeable oil and gas development would have no effect on the rabbitsfoot, pink mucket, fat pocketbook, scaleshell, and piping plover due to a lack of suitable habitat on EOI #961b. No official determination is being made for the bald eagle due to the species being delisted although protection will still be afforded by the MBTA and BGEPA.

Threatened and endangered species may be disturbed during construction, drilling, or hydraulic fracturing operations, as these activities involve many vehicles, mobile and non-mobile heavy equipment, and numerous noise-producing equipment (i.e. generators, compressors). The most significant impacts would be limited to the construction, drilling, and completion/stimulation phases, which can span from several weeks to several months and is entirely dependent on the size and extent of new surface disturbance, length of the well bore, formations encountered during drilling, or whether hydraulic fracturing is used, just to name a few factors. During production, impacts from noise and human disturbance would greatly diminish with time. In general, most wildlife species would become habituated to the disturbances. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic from inspectors and semi-trucks hauling produced fluids, noise from compressors and/or a pump-jack if needed, and equipment maintenance. These impacts would last for the life of the well.

Activities associated with oil and gas production that could occur from development on the proposed lease could result in decreased use of this site by threatened and endangered species. Human noise and activity associated with production could cause wildlife to move elsewhere. In addition, a decrease in available habitat due to construction of well pads and access roads could also cause wildlife to move to surrounding areas. Reclamation of well pads could allow for species to use the sites again as long as reclamation creates similar habitats to what was originally there. In short, cumulative impacts associated with continued oil and gas development in the area could include displacement of threatened and endangered species to surrounding areas or a decrease in population viability if suitable habitat is not available in the surrounding area.

BLM has determined that the proposed project will have no effect on the pink mucket, fat pocketbook, scaleshell, and snuffbox freshwater mussels, the Hell Creek cave crayfish, and the piping plover on all EOIs located in Cleburne, Stone, Van Buren, and White Counties, due to a lack of suitable habitat on the proposed project sites. BLM has determined that the project may affect, but is not likely to adversely affect the northern long-eared, Indiana, and gray bat species (on all EOIs) as well as the speckled pocketbook and rabbitsfoot freshwater mussels and the yellowcheek darter on two EOIs in Cleburne County (EOI #s 728 and 730) and on three EOIs in Van Buren County (EOIs #s 738, 739, 743). Additionally, BLM has determined that the project may affect, but is not likely to adversely affect the speckled pocketbook on EOI #961b in White

County. However, mitigation measures as described below will minimize potential affects that could occur from development of the proposed parcel.

4.13.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.13.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

A BLM stipulation regarding rare species applies to this proposal. The BLM stipulation states that the BLM may recommend modifications to exploration and development proposals to further the conservation and management objectives for threatened, endangered, or other special status plant or animal species or their habitat to avoid BLM-approved activity that would contribute to a need to list such a species or their habitat. To protect threatened, endangered, candidate, proposed, and BLM sensitive plant species, a second stipulation applies to this lease. The stipulation states that all suitable special status plant species habitat will be identified during environmental review of any proposed surface use or activity. If field examination indicates that habitat of one or more of these species is present, the BLM will require a survey by a qualified botanist for special status plants during periods appropriate to each species. Operations will not be allowed in areas where sensitive plants would be affected.

The Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision (2007) indicates Indiana bats may be found various distances from hibernacula (approximately 2.5 to 10 miles away (USFWS 2007). Several studies have documented male Indiana bats 10 miles away from their hibernaculum upon emergence from their hibernation (Hobson 1995; 3D International, 1998). Based on USFWS guidance, known Indiana bat habitat includes habitat located 1) within 5 miles of an Indiana bat female (reproductive or non-reproductive) or juvenile capture record without an identified maternity roost tree; 2) within 2.5 miles of an Indiana bat maternity roost or male capture record; and 3) within 10 miles of an Indiana bat hibernaculum (USFWS 2011). Indiana bats utilize similar habitat or share hibernacula with other bat species. Because of the uncertainty of which bat species may be present at the leasing stage, the recommended buffers for the Indiana bat are applicable to the Proposed Action until further clarification is obtained at the APD stage.

Two BLM bat stipulations are attached to the proposed lease (Appendix A). The first stipulation states that no surface occupancy or disturbance will be permitted within 10 miles of documented hibernacula, 5 miles of maternity roosts, and 2.5 miles of non-maternity record locations for special status bat species analyzed in this EA. The second stipulation states that no removal of trees or snags over 5 inches in diameter permitted between March 16 and November 30 within known or potential range of the northern long-eared bat in order to prevent disturbance of summer/nursery roosting areas of special status bats. An exception may be granted if the project can be modified sufficiently to result in no adverse effect on special status species, with

concurrence from the USFWS. Formal or informal consultation with USFWS would occur at the APD stage if it is determined that the project may have an effect on the northern long-eared bat.

Freshwater aquatic habitat stipulations as described above (Section 4.10.3) will protect the aquatic species listed.

4.13.4 Informal Consultation

BLM has determined that the proposed project will have no effect on the pink mucket, fat pocketbook, scaleshell, and snuffbox freshwater mussels, the Hell Creek cave crayfish, and the piping plover on all EOIs located in Cleburne, Stone, Van Buren, and White Counties, due to a lack of suitable habitat on the proposed project sites.

BLM has determined that the project may affect, but is not likely to adversely affect the northern long-eared, Indiana, and gray bat species (on all EOIs) due to the presence of suitable roosting habitat for the northern long-eared and Indiana bat and the presence of foraging habitat for all three bat species.

BLM has determined that the project may affect, but is not likely to adversely affect the speckled pocketbook and rabbitsfoot freshwater mussels and the yellowcheek darter on two EOIs in Cleburne County (EOI #s 728 and 730) and on three EOIs in Van Buren County (EOIs #s 738, 739, 743) due to the existence of suitable habitat.

Additionally, BLM has determined that the project may affect, but is not likely to adversely affect the speckled pocketbook on EOI #961b in White County due to the existence of suitable habitat.

Informal consultation with USFWS, Arkansas Ecological Services Office (ARESO) was initiated on August 25, 2017. A response letter was received on October 13, 2017 and is located in Appendix B.

There is no statutory requirement for USFWS to concur with a "no effect" determination so the ARESO provided no additional comments or concerns regarding the pink mucket, fat pocketbook, scaleshell, and snuffbox freshwater mussels, the Hell Creek cave crayfish, and the piping plover on all EOIs located in Cleburne, Stone, Van Buren, and White Counties.

Because no surface disturbance is authorized and any surface disturbance would be addressed under a separate consultation, the USFWS concurred with the BLM determinations. Informal consultation will be initiated at the APD stage if it is found that there is suitable habitat for any of the species above at the specific project sites.

4.14 Migratory Bird Species of Concern

4.14.1 Proposed Action

While the act of leasing would not affect migratory birds, subsequent exploration/development of the subject parcels may produce impacts. Surface disturbance from the development of well

pads, access roads, pipelines, and utility lines can result in an impact to migratory birds and their habitat.

USFWS estimates that many migratory birds are killed annually throughout the U.S. in oil field production skim pits, reserve pits, and centralized oilfield wastewater disposal facilities. Numerous grasshoppers, moths, June bugs, and the like become trapped on the surface in tanks and on pits, and become bait for many species of migratory birds. Open tanks and pits then become traps to many species of birds protected under the MBTA. Properly covered tanks and pits (and regularly inspected covered tanks and pits) is imperative to the continued protection of migratory birds in the well pad area.

4.14.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcels would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

4.14.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Per the Memorandum of Understanding between BLM and USFWS, entitled, "To Promote the Conservation of Migratory Birds," the following temporal and spatial conservation measures must be implemented as part of the COAs with an APD:

- 1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.
- 2. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible.
- 3. If no migratory birds are found nesting in the proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.

To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds, the following standard BLM COAs would apply at the APD stage, should federal minerals be accessed:

• Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds

 All power lines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee (APLIC)

4.15 Public Health and Safety

There would be no direct impacts to public health and safety from leasing, since leasing is an administrative action. Public health and safety considerations associated with potential future oil and gas development include potential effects from air emissions, potential exposure to contamination, and increased truck traffic. BLM acknowledges that if the leasing areas were to be developed in the future, environmental hazards of exploration, production or extraction of oil and gas may produce some effects to public health or safety if not properly managed. Areas of intense oil and gas development pose public health and safety risks, especially when industrial traffic and hazardous materials are present. For an environmental hazard to pose a risk to public health, a vulnerable human population must first come into contact or be exposed to the hazard. Therefore, communities or workforce residing or working near the potential development sites may be at higher risk for accidental spills, fugitive emissions or releases of gas from a future well bore. The level of effect would depend on the product released or spilled, level of activity, density of development, technological and safety controls/regulations in place, and the receptors' susceptibility to risk.

As of 2014, most studies addressing the public health implications of oil and gas development have been either predictive and/or descriptive hypothesis generating. The few analytic studies are preliminary and do not provide enough evidence to conclusively determine if oil and gas operations directly result in health effects in nearby populations. Existing studies have provided evidence that hazards are inherently present in and around oil and gas operations and populations can be exposed to these hazards if safety measures are not implemented. People living near oil and gas operations have reported that oil and gas operations affect their health and quality of life, particularly through traffic accidents, air and water pollution, and social disruption expressed as psychosocial stress (University of Colorado at Boulder, 2015). Some short-term health effects reported by people living near oil and gas operations include irritation of the eyes, nose, throat, lungs or skin, or other symptoms like headache, dizziness or nausea and vomiting. Some also report sleep disturbance or anxiety associated with noise or light effects from mineral development activities. There is very little information about long-term health effects in people living near oil and gas operations. The amount of scientific literature connections between oil and gas related exposures and a health effect is currently limited but is growing (Colorado Department of Public Health and Environment (CDPHE), 2016).

One of the primary ways in which the public could be exposed to pollutants associated with potential future oil and gas operations is through the air. There is also the possibility of exposure through surface water, groundwater or soil, but this is much less likely under normal operating conditions due to the numerous safety protocols implemented by oil and gas operations (CDPHE, 2016). Numerous scientific studies have linked air pollution to a variety of health problems including: (1) respiratory and cardiovascular disease, (2) decreased lung function, (3) increased frequency and severity of respiratory symptoms such as difficulty breathing and coughing, (4) increased susceptibility to respiratory infections, (5) effects on the nervous system, including the

brain, such as IQ loss and impacts on learning, memory, and behavior, (6) cancer, and (7) premature death. Sensitive individuals or those at high risk appear to be at even greater risk for air pollution-related health effects, for example, those with pre-existing heart and lung diseases (e.g., heart failure/ischemic heart disease, asthma, emphysema, and chronic bronchitis), diabetics, older adults, and children. Future mineral development operations on this lease parcel that would violate a state and/or federal air quality standard would not be approved.

Future mineral development within these lease parcels would likely result in a minor increase in truck traffic, noise, and potential visual and light pollution effects. As discussed throughout this EA, potential effects from possible future oil and gas operations on the lease parcels would be minimized through the application of best management practices, standard operating procedures, and potential mitigations.

4.16 Transportation

Leasing minerals within the proposed parcels would not result in any direct impacts to the existing transportation network in the vicinity of the site since there would be no ground disturbance associated with leasing. Potential impacts to existing roads and traffic patterns may occur, however, from future mineral development. As discussed in the RFDS for these parcels, access roads may be needed to support future oil and gas development. Adequate access to a well can be provided by:

- Using existing roads, some of which may need upgrading;
- Constructing a new road; or/and
- A combination of both.

Due to the undeveloped nature of the lease parcels, new road construction would likely be needed. Since the proposed parcels are relatively small in size, potential clearing needed for an access road would not be extensive.

Heavy vehicles may cause paved roads in the vicinity of the lease parcels to crack, or deteriorate, especially along the edges of the narrower roadways. Gravel and dirt roads may be subject to the formation of ruts, potholes, and washboard effects. The level of impact is dependent upon the amount of activity, weather conditions during the activity and the level of road maintenance. The greatest effects would likely occur for a relatively short duration during the drilling and plugging phases of future oil and gas operations which usually require the use of heavy vehicles and equipment.

Future mineral development within the proposed lease parcels would likely result in a minor increase in truck traffic to the area, resulting in a slight increase in risk of potential collisions with wildlife crossing the roads, such as the white-tailed deer. Increased particulate matter in the form of dust from vehicular traffic would impair visibility, decrease potential browsing, pollinating, and nesting for wildlife, and impair vegetative growth on the edges of unimproved roadways. Effects to traffic patterns on the nearby road system may vary depending on the location(s) of the future well(s) and the time of day the roads are used. Increases in vehicle traffic associated with potential future mineral development may result in periodic traffic-related inconveniences. An increase in truck traffic may also increase the risk of potential traffic-related

accidents. After exploration and drilling, the vehicle traffic would decline but would still be subject to the occasional need for vehicle access to the well site.

4.17 Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from 'the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Recent CEQ guidance in considering cumulative effects involves defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographical and temporal overlaps among the Proposed Actions and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between the Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated.

To identify cumulative effects, three fundamental questions need to be addressed:

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the affected area includes the proposed lease areas and surrounding vicinity.

4.17.1 Context for Cumulative Effects Analysis

Offering the subject parcels for lease, and the subsequent issuance of the lease, in and of itself, would not result in any cumulative impacts; however, the Proposed Action does include an analysis of the potential reasonably foreseeable oil and gas development that could occur in the future associated with the lease parcels, which serves as the basis for assessing whether there could be any cumulative effects associated with the possible future development of the lease parcel. The 2766.06 acres of federal mineral estate could potentially add 74 or more horizontal wells from 41 well pads if the parcels are leased and developed.

4.17.2 Cumulative Effects Analysis

The area surrounding the seventeen (17) EOIs in the quad-county area of Cleburne, Stone, Van Buren, and White Counties contains natural gas well development activity in ranges from no current activity to heavy activity (30+ wells per township). All are located within the Fayetteville Shale formation. The following five (5) EOI #s have no current vicinity natural gas well activity: 726, 728, 743, 1103, and 1174. Six (6) EOI #s (737, 739, 1148, 1469, 1770, and 1773) are located in areas currently classified as light well activity (<10 wells per township). Two (2) EOI #s, 730 and 738, are located in areas classified as moderate well activity (10-30 wells per township). Four (4) EOI #s are located in an area of heavy well activity (630, 733, 961b, 1086). The incremental effect of the Proposed Action and No Action Alternative in combination with other past, present, or reasonably foreseeable actions on resources including land use, visual/noise resources, vegetation and wildlife (including invasives and migratory birds), soil resources, cultural resources, water resources, soils, and wastes is relatively minor. Further sitespecific NEPA analysis will be conducted at the APD stage, along with additional consultations and surveys as required. Further NEPA analysis at the APD stage will address cumulative impacts of any proposed development at the site-specific level; however, this EA does discuss cumulative impacts from leasing on a general level. Following is a discussion of potential cumulative effects associated with the Proposed Action and No Action Alternative.

Land Use

There would be no cumulative impacts to land use as a result of leasing seventeen (17) EOIs; however, the RFD scenario projects approximately 240.14 acres of surface disturbance associated with reasonably foreseeable development from potential future oil and gas activities. The area surrounding the seventeen EOIs is largely rural with minimal development. Other activities occurring in the area include forestry, recreation, and agriculture, which over time may contribute to changes in existing land uses if these activities are changed or expanded. Potential future development associated with the leasing of these seventeen (17) EOIs would contribute minimally to land use conversion in the area and is consistent with ongoing uses of the land in the general vicinity of the proposed lease parcel. Therefore, there would be no perceptible cumulative impacts to land use from implementing the Proposed Action and No Action Alternative.

Visual/Noise Resources

There would be no cumulative impacts to visual and noise resources as a result of leasing seventeen EOIs in Cleburne, Stone, Van Buren, and White Counties, Arkansas. The RFD scenario projects approximately 240.14 acres of surface disturbance associated with reasonably foreseeable development from potential future oil and gas activities. Because the area surrounding the proposed seventeen (17) EOIs in Cleburne, Stone, Van Buren, and White Counties is largely rural with minimal development, there are few noise-generating activities in the area above and beyond those typical of a rural, agricultural area. Forestry and agriculture activities typically do not produce noise levels that would result in noise ordinance violations. Because the other activities in the area are spatially separated, the Proposed Action and No Action Alternative would not result in a cumulative impact to the noise or visual environment.

Cultural Resources and Native American Concerns

There would be no cumulative impacts to cultural resources as a result of leasing seventeen (17) EOIs; however, potential cumulative effects to cultural resources could occur if future development activities on or near the parcels are conducted without proper surveys and consultations under the NHPA or state requirements. Cumulative effects from repetitious illegal activity, primarily archeological vandalism, may occur on certain sites or site types unless perpetrators are apprehended and prosecuted. The degree of cumulative effects to known properties from BLM activities, however, should be slight as inventory, assessment, protection, and mitigation measures would be implemented at the APD stage if federal minerals are accessed. Under the No Action Alternative, operators in the vicinity would be required to comply with all required laws and regulations with regard to protection of cultural resources and Native American Concerns.

Socioeconomics and Environmental Justice

Cumulative effects to socioeconomics from reasonably foreseeable future development would likely be positive, but minor. At this time, it is not possible to determine with certainty the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in Cleburne, Stone, Van Buren, and White Counties. Additional analysis will be conducted at the APD stage where socioeconomic impacts will be further assessed. Many of the cumulative socioeconomic effects and impacts associated with oil and gas development are already occurring in the region and would be perpetuated in the future. For instance, oil and gas activity is generating employment opportunities and labor earnings for communities that support these types of activities.

The Proposed Action and No Action Alternative would not disproportionately affect low income or minority populations; therefore, there would be no cumulative effects to these groups.

Soils

Increases in mineral development, construction activities, and the conversion of land to developed landscapes collectively result in the removal of vegetation, long-term reduction in vegetation cover, and disturbance of soils. This would expose soils to the erosive forces of wind and water, destabilize soils, and increase overland flow, which in turn could result in accelerated erosion. Accelerated erosion could mobilize soils and remove nutrient-rich topsoil, and thereby reduce soil productivity and vegetation growth rates. The incremental effect of the Proposed Action and No Action Alternative with other activities on soils in the vicinity would be small. Cumulative impacts to soil resources would therefore be negligible.

Mineral Resources

There would be no cumulative impacts to minerals from the administrative action of leasing the seventeen (17) EOIs, but the potential reasonably foreseeable development projected under the RFD scenario in combination with other mineral development activities in the area would result in a minor incremental effect from development on BLM federal mineral estate. At this stage it is

uncertain how productive the wells accessing the federal mineral estate would be, should development occur in the future. If developed, the mineral resources would be drained and depleted over time.

Wastes

As noted in the Proposed Action description, impacts from waste storage, handling, and disposal would be minimized through the use of BMPs, SOPs, and COAs at the APD stage, should federal minerals be proposed for development. Other mineral development, agriculture, and timber management activities in the area would need to comply with all required laws and regulations with regard to wastes. Therefore, cumulative effects from wastes are not anticipated.

Natural Resources (Vegetation and Wildlife, Special Status Species, Invasive Species, Migratory Birds)

The Proposed Action and No Action Alternative would contribute a minor amount of potential vegetation loss from reasonably foreseeable development. Under the RFD scenario, approximately 240.14 acres of surface disturbance could occur from future oil and gas activities associated with the seventeen (17) EOIs. The loss of vegetation would also affect wildlife using that habitat, although many species would likely relocate during construction from future development activities. Reclamation activities would help restore vegetation conditions. Future site-specific analysis would be conducted at the APD stage. Cumulative effects to vegetation, wildlife, special status species, and migratory birds would be minor and cumulative effects to the population level of species are not expected. The Proposed Action would not be expected to significantly compound current patterns of habitat fragmentation, degradation, or wildlife patterns. If BLM weed control strategies are implemented, cumulative effects due to invasive species are not anticipated.

Water Resources (Surface and Ground Water, Floodplains, Riparian Areas, and Wetlands)

There would be no cumulative impacts to water resources from the administrative action of leasing the seventeen (17) EOIs, however, energy and mineral development, construction activities, forestry, agriculture, and the conversion of land to developed landscapes, collectively results in the removal of vegetation, long-term reduction in overall vegetation cover, and disturbance of soils. This would increase overland flow, result in accelerated soil erosion, and decrease the ability of watersheds to buffer high flows and filter water, sediment, and nutrients. Soil mobilized by wind and water erosion would be transported downslope and to nearby water bodies, which would increase sediment and nutrient loads to streams, rivers, lakes, and reservoirs and thereby degrade water quality. Increases in overland flow also would directly increase the amount of water transported to streams and rivers, which could lead to increased downcutting, widening, and overall degradation of stream channels. The incremental effect of the Proposed Action and No Action Alternative would result in negligible cumulative effects to surface water.

Oil and gas wells have the potential to affect groundwater quality and quantity through withdrawal, injection, and unintentional leakage and spills. Proper well design, construction, drilling, and completion methods would reduce the likelihood of these impacts but would not

entirely eliminate them. Hydraulic fracturing is used to enhance recovery by enlarging fractures through which oil and gas can be drawn to a wellbore and brought to the surface. After fluids are injected at high pressures to expand fractures, injected fracture fluids and some formation water flows back to the surface and is removed to allow gas and/or oil to flow into the wellbore. In recent years there has been an elevated public concern about the possibility of subsurface hydraulic fracturing operations creating fractures that extend well beyond the target formation to water aquifers, allowing methane, contaminants naturally occurring in formation water, and fracturing fluids to migrate from the target formation into drinking water supplies (Zoback et al 2010). Contamination of groundwater could occur without adequate cementing and casing of the proposed well bore. For completion or formation fluids to escape the wellbore and affect the usable quality water or contaminate or cross contaminate aquifers, the fluid would have to breech several layers of steel casing and cement. Failure of the cement or casing surrounding the wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, fracturing fluids, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling and hydraulic fracturing, allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination. Cumulative effects to ground water are not anticipated if SOPs, BMPs, and COAs as described in this EA and identified during the APD process are followed, should federal minerals be proposed for development.

Air Quality

Cumulative effects from potential oil and gas development from the proposed leases and possible future development could be an overall increase in CO, NOx, SO₂, Pb, PM, CO₂, CH₄, and N₂O. However, according to USEPA's Air Trends report for 2011 (USEPA 2011), since 1990, nationwide air quality has improved significantly for the six common air pollutants (Figure 4-1). These six pollutants are ground-level O₃, PM_{2.5}, PM₁₀, Pb, NO₂, CO, and SO₂. Nationally, air pollution was lower in 2010 than in 1990 for:

- 8-hour O₃, by 17%
- 24-hour PM₁₀, by 38%
- 3-month average Pb, by 83%
- annual NO₂, by 45%
- 8-hour CO, by 73%
- annual SO_2 , by 75%

Nationally, annual $PM_{2.5}$ concentrations were 24% lower in 2010 compared to 2001 and 24-hour $PM_{2.5}$ concentrations were 28% lower in 2010 compared to 2001. O_3 levels did not improve in much of the East until 2002, after which there was a significant decline. Eight-hour O_3 concentrations were 13% lower in 2010 than in 2001. This decline is largely due to reductions in NOx required by USEPA rules including the NOx State Implementation Plan (SIP) Call,

preliminary implementation of the Clean Air Interstate Rule (CAIR), and Tier 2 Light Duty Vehicle Emissions Standards.

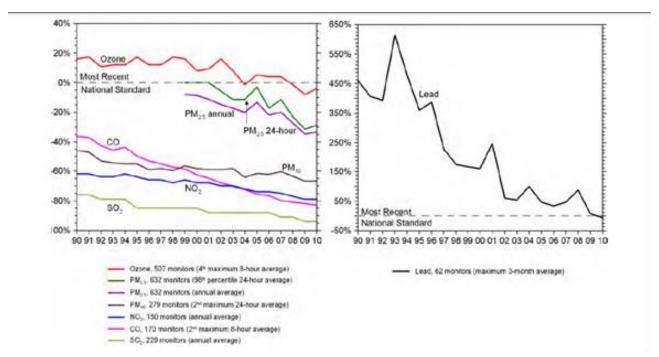


Figure 4-1. Comparison of national levels of the six common pollutants to the most recent NAAQS, 1990-2010. National levels are averages across all monitor stations with complete data for the time period. Note: Air quality data for PM_{2.5} starts in 1999 (USEPA, 2011).

USEPA concludes that total emissions of toxic air pollutants have decreased by approximately 42% between 1990 and 2005. Control programs for mobile sources and facilities such as chemical plants, dry cleaners, coke ovens, and incinerators are primarily responsible for these reductions. They also found that monitored concentrations of toxic pollutants such as benzene, 1,3-butadiene, ethylbenzene, and toluene decreased by 5% or more per year between 2003 and 2010 at more than half of ambient monitoring sites. Other toxic air pollutants of concern to public health such as carbon tetrachloride, formaldehyde, and several metals, declined at most sites.

Climate Change

The administrative action of leasing would not result in any GHG emissions; however, potential future development would likely result in GHG emissions. In October 2012, USEPA regulations that require control of VOC emissions from oil and gas development became effective. These regulations will reduce VOC emissions from oil and gas exploration and production emissions that contribute to the formation of O₃. Emissions from any lease development are not expected to impact the 8-hour average O₃ concentrations, or any other criteria pollutants in the area of the proposed lease. The Proposed Action would not result in a violation of any NAAQ or criteria pollutant in the area of the proposed lease.

The incremental contribution to global GHGs from the Proposed Action cannot be translated into effects on climate globally or locally, due to the uncertainties associated with ongoing scientific research. When further information on the impact to climate is known, such information would be incorporated in the BLM's planning and NEPA documents as appropriate.

4.18 Irreversible and Irretrievable Commitments of Resources

NEPA Section 102(2)C requires a discussion of any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or disturbance to protected cultural resources). An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., extraction of any solid mineral ore or fluid mineral).

Reasonably foreseeable oil and gas development associated with the Proposed Action would result in a minor amount of surface disturbing activities that would result in irreversible or irretrievable commitments of resources. These surface disturbing activities would result in alterations to soil, removal of vegetation cover and wildlife habitat, and possible damage to cultural resources if proper surveys and consultations are not conducted under the NHPA. Increases in sediment and nonpoint source pollution that result from these activities could result in degradation of water quality within the watershed and habitat for aquatic-dependent species, although no major surface waters are located adjacent to the parcel. Use of BMPs, SOPs, COAs and stipulations as described in the EA are designed to reduce the magnitude of these impacts by preventing habitat degradation. Development of oil and gas wells would represent an irretrievable commitment of nonrenewable fossil fuels.

4.19 Relationship between Local Short-term Uses and Long-term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and of the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use eliminates the possibility of other uses being performed at the site.

The Proposed Action would take place within a relatively rural area with minimal development. No unique habitat or ecosystems would be lost due to this action. Implementation of the Proposed Action or No Action Alternative may result in future oil and gas development, which results in surface disturbing and other disruptive activities that remove vegetation, increase soil erosion and compaction, create visual intrusions and landscape alterations, increase noise, and degrade wildlife habitat. Although management actions, BMPs, surface use restrictions, and lease stipulations are intended to minimize the effect of short-term uses, some impact on long-term productivity of resources would occur; however, the level of impact would be minor.

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APPENDIX A: LEASE STIPULATIONS AND NOTICES FOR (17) EOIs in Table ES-1. STIPULATIONS

BLM

Cultural Resources and Tribal Consultation

Stipulation: These leases may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. These obligations may include a requirement that you provide a cultural resources survey conducted by a professional archaeologist approved by the State Historic Preservation Office (SHPO). If currently unknown burial sites are discovered during development activities associated with this lease, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate tribe/group of federally recognized Native Americans will take place. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.

Endangered Species

Stipulation: The lease areas may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. '1531 et seq., including completion of any required procedure for conference or consultation.

Exception: None

Modification: None

Waiver: None

Sensitive Plant Species

<u>Stipulation (CSU):</u> All suitable special status plant species habitat will be identified during environmental review of any proposed surface use activity. If field examination indicates that habitat of one or more of these species is present, the BLM will require a survey by a qualified botanist for special status plants during periods appropriate to each species. Operations will not be allowed in areas where sensitive plants would be affected.

Objective: To protect threatened, endangered, candidate, proposed, and BLM sensitive plant species.

Exception: An exception may be granted if the operator agrees to implement measures developed in consultation with USFWS and in coordination with State agencies.

Modification: The stipulation may be modified if it is determined that a portion of the lease area does not contain sensitive plant species habitat.

Waiver: The stipulation may be waived if, based on field surveys, it is determined that the lease area does not contain sensitive plant species habitat.

Bats – Applies to all EOI #s

Stipulation (NSO): No surface occupancy or disturbance would be permitted within 10 miles of hibernacula, 5 miles of maternity roosts, and 2.5 miles of non-maternity record locations for the following species: gray bat, Indiana bat, Ozark big-eared bat, northern long-eared bat, and Virginia big-eared bat.

Objective: To avoid adverse effects to special status bats.

Exception: An exception may be granted if the project would not result in adverse effects to these special status bats or their habitat, with concurrence from the USFWS.

Modification: None.

Waiver: This stipulation may be waived if the lease does not contain suitable habitat for gray bat, Indiana bat, northern long-eared bat, Ozark big-eared bat, Virginia big-eared bat, with concurrence from USFWS.

Bats (CSU Stipulation)

Stipulation: No removal of trees or snags over 5 inches in diameter permitted between March 16 and November 30 within known or potential range of the northern long-eared bat.

Objective: To prevent disturbance of summer/nursery roosting areas of special status bats.

Exception: An exception may be granted if the project can be modified sufficiently to result in no adverse effect on special status species, with concurrence from the USFWS.

Modification: None

Waiver: None

Freshwater Aquatic Habitat – Applies to EOI #s 630, 726, 728, 730, 733, 738, 739, 743, 961b, 1086, 1103, 1148, 1174, 1469, 1770, 1773.

Stipulation (NSO): No surface occupancy or disturbance, including discharges, are permitted within 250 feet of a river, stream, wetland spring, headwater, wet meadow, wet pine savanna, pond, tributary, lake, coastal slough, sand bar, vernal pools, calcareous seepage marsh, or small, marshy calcareous stream. If the slope exceeds 10 percent, the buffer may be extended to 600 feet to provide adequate protection for aquatic habitats and associated species.

Regardless of buffer width, appropriate sediment and erosion control BMPs should be implemented as defined in the following USFWS documents: (1) Arkansas Best Management Practices for Fayetteville Shale Natural Gas Activities (2007) and (2) Arkansas Best Management Practices for Natural Gas Pipeline Construction and Maintenance Activities in the Fayetteville Shale Area – Upper Little Red River Watershed (2009). These BMP documents can be found at https://www.fws.gov/arkansas-es/docs/.

Objective: To protect the water quality of watersheds and natural stream substrate and morphology and to avoid potential impacts to aquatic species and their habitat.

Exception: An exception may be granted if the operator agrees to 1) span creeks, rivers, wetlands, and floodplains by attaching pipelines to bridges; 2) directionally drill wells and pipelines from upland sites under creeks, rivers, other waters, and wetlands or3) implement other measures developed in consultation with USFWS and in coordination with State agencies.

Modification: The buffer may be reduced if the adjacent waterway has been surveyed for 100 yards upstream and 300 yards downstream of the site, and the results document the lack of suitable/occupied/critical habitat for listed species which may be affected by the project, as determined by the BLM and USFWS.

Waiver: None

LEASE NOTICES/BEST MANAGEMENT PRACTICES

Migratory Birds and Federally Listed Wildlife

Objective: To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds and federally listed wildlife.

Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds.

All powerlines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee (APLIC 2006)

Perching and Nesting Birds and Bats

Objective: To prevent birds and bats from entering or nesting in or on open vent stack equipment.

Open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units and, to the extent practical, to discourage birds from perching on the stacks. Installing coneshaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

Invasive and Non-Native Species

Objective: To discourage the spread of invasive, non-native plants.

Use of native or non-invasive plants in seeding mixtures will be encouraged to stabilize disturbed areas and during restoration activities. Construction sites will be surveyed for invasive species prior to ground disturbance. If invasive species are found, the proper control measures will be used to either eradicate the species from the area or minimize its spread to other areas. If cogongrass is found on site, equipment will be washed before exiting the site to prevent the spread of this highly invasive species to other locations. Post-construction monitoring for cogongrass and other invasive plant species should be conducted to ensure early detection control. In the case of split-estate lands, final seed mixtures will be formulated in consultation with the private landowner.

Pesticide Application

Objective: To protect the water quality of watersheds and natural stream substrate and morphology supporting special status species and their host species.

Any ground application of herbicides or other pesticides, sterilants, or adjuvants within 150 feet of listed species or habitat will require site-specific control measures developed in coordination or formal consultation with USFWS. No aerial application of herbicides or pesticides will be permitted.

APPENDIX B: AGENCY AND TRIBAL CORRESPONDENCE



Ast Hutchinson Governor

> Study Hurst Director

Arkansas Arts Council

Arkansus Nutural Heritage Commission

Ackarisas State Archives

Deba Odnical Center

Historie Arkansas Museum

Mosace Templars Cultural Center

Old State House Museum



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e-mail: Info@arkansaspreservation.org website: www.arkansaspreservation.com

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March 20, 2017

Ms. Alison McCartney
Acting Assistant Field Manager
Natural Resources Program Specialist
United States Department of the Interior
Bureau of Land Management, Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232



RE: Van Buren County – General Section 106 Review – FSA

Proposed Undertaking: Lease of federal minerals under privately owned surface, i.e. split-estate minerals

AHPP Tracking Number: 97679

Dear Ms. McCartney:

This letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program (AHPP) has reviewed records pertaining to the area in question.

There are no recorded critural resources located within this undertaking. However, due to the scarcity of cultural resources surveys conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of direct impacts

Tribes that have expressed an interest in the area include the Osage Nation (Dr. Andrea Hunter), the Quapaw Tribe of Oklahoma (Mr. Evered Bandy), the Shawnee Tribe of Oklahoma (Ms. Kim Jumper), and the United Kectoowah Band of Cherokee Indians (Mr. Eric Oosahwee-Voss). We recommend that they be consulted in accordance with 36 CFR § 800.2 (c) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dodson of my staff at 501-324-9784.

Sincerely,

Marian Boyd

Interim Director, AHPP

e: Dr. Ann Early, Arkansas Archeological Survey

Dr. Andrea Hunter, Osage Nation



RE: EOI 630 Van Buren Co Ar.

Erin Thompson <ethompson@astribe.com>
To: "Sullivan, John" <j35sutlivan@blm.gov>

Wed, Mar 15, 2017 at 11:01 AM

RE: 8100 (020) JMS

To Whom It May Concern:

In accordance with Section 106 of the National Historic Preservation Act of 1968, as amended (18 U.S.C. 470f), and implementing regulation, 36 CFR 600, "Protection of Historic Properties" the Absentee Shawnee Tribal Historic Preservation Office is responding to your request for identifying properties of significance to our Tribe within Van Buren County, Arkansas

The Absentee Shawnee has historic ties within the area referenced in your letter of March 8, 2017. At this time, this office is unaware of properties of significance to inform you of that fall within the APE for this project.

There remains the possibility that unrecorded cultural resources, including archaeological artifacts or human remains, may be encountered during construction, demolition or earthmoving activities of this project. Should this occur, we require you contact this office in order that we may offer appropriate comments under 36 CFR 800.13. Email is the preferred method of communication.

Best Regards,

Erin Thompson

Tribal Historic Preservation Officer

Absentee Shawnee Tribe of Oklahoma

2025 Gordon Cooper Drive

Shawnee, OK 74801

(P) 405.275.4030 Ext. 6340

ethompson@astribe.com

From: Sullivan, John [mailto: 35sullIvan@blm.gov]

Sent: Thursday, March 09, 2017 3:15 PM

To: Erin Thompson

Subject: Re: EOI 630 Van Buren Co Ar.





Office of the Chief

Bill John Baker Principal Chief 9P Ch. 155&&&F 0-18GA

S. Joe Criticades Deputy Principal Chief & KG. MEY&Y WPA DLd'A DESGA

March 22, 2017

Bruce Dawson, District Manager Southeastern States district Office US DOI/ Bureau of Land Management 273 Market St. Flowood, MS 39232

Re: EOI 630 Project

Bruce Dawson:

The Cherokee Nation (CN) is in receipt of your correspondence re the EOI 630 Project and appreciates the opportunity to provide comment upon this project. The Cherokee Nation maintains databases/records of cultural/historic/pre-historic resources in this area. Our Historic Preservation Office has reviewed this project and cross referenced the project's legal description against our information and has found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that all project activities be immediately halted and you re-contact our Offices for further consultation. Additionally, we would request your Organization conduct appropriate inquiries with the Arkansas State Historic Preservation Offices regarding historic/prehistoric resources not included in the CN databases/records. If you require additional information or have any questions, please contact me at your convenience:

- 918/453-5704
- pat-gwin@cherokee.org

Thank you for your time and attention to this matter.

Sincerely,

Pat Gwin

Administration Liaison

Cherokee Nation



TRIBAL HISTORIC PRESERVATION OFFICE

Date: April 26, 2017

File: 1617-2194AR-3

RE: DOI, BLM, EOI 630, Lease federal minerals in Van Buren County, AR

BLM—Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed project DOI, BLM, EOI 630, Lease federal minerals in Van Buren County, AR. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



SNO response to BLM and EOI 630 mineral lease

Theodore Isham <isham.t@sno-nsn.gov> To: "Sullivan, John" <j35sullivan@blm.gov> Mon, Mar 20, 2017 at 9:41 AM

This *Opinion* is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma requests a listing of the flora in the impact area and that as part of the possible for loss of wetlands, that the proponent replant plants that are culturally significant to the SNO if applicable. We hereby request that these plants be considered for repopulation of the riparian area; the list of Cherokee 7 traditional medicinal plants, river cane and salix Carolina. The Seminole Nation of Oklahoma then will concur with the recommendation of 'no adverse effect'. Therefore, we have no other comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oklahoma

Historic Preservation Officer

PO Box 1498

Seminole, Ok 74868

Phone: 405-234-5218

e-mail; isham.t@sno-nsn.gov



8100 (020) JMS/Van Buren County (Bee Branch Quadrangle)

1 message

Tonya Tipton <tonya@shawnee-tribe.com> To: j35sullivan@blm.gov

Thu, Mar 23, 2017 at 10:12 AM

This letter is in response to the above referenced project.

The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project.

We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume consultation under such a circumstance.

Thank you for giving us the opportunity to comment on this project,

Sincerely,

Tonya Tipton

Shawnee Tribe





Sullivan, John <j35sullivan@blm.gov>

FW: EOI 630 Van Buren Co Ar., 8100 (020) JMS

karen pritchetf <kprilchel/@ukb-nsn.gov>

Wed, Apr 26, 2017 at 3:41 PM

To: "j35sufliven@BLM.Gov" <j35sufliven@blm.gov> Co: "Tim.dodson@arkensas.gov" <Tim.dodson@arkensas.gov>, Eric Onsahwee-Voss <eronsahwee-voss@ukb-nart.gov>, karen.pritchett <kpritchett@ukb-nart.gov>

Dear John,

On behalf of Tribal Historic Preservation Officer (THPO) Eric Oosahwee-Voss, please accept this digital communication regarding the Bureau of Land Management (SLM) Expression of Interest (EDI) 630, to lease federal minerals under privately owned surface, i.e. split-estate minerals in Van Buren County, Arkansas. 8100 (020) JMS

Please be advised that the proposed undertaking lies within the traditional territory of the United Kectouwah Band of Cherokee Inclians in Oklahuma (UKB). This opinion is being provided by UKB THPO, pursuant to authority vested by the UKB Corporate Board and under resolution 16-UKB-34. The United Keetoowsh Band is a Federally Recognized indian Nation headquartered in Tahlequah, OK

We agree that a cultural resources survey is warranted prior to ground disturbing activities. Please forward a copy of the report, when complete, for our review.

Thank you for consulting with the UKB. Please note that these comments are based on information available to us at the time of the project review. We reserve the right to revise our comments as information becomes available, if you have any questions or concerns, please contact me at (918) 458-6715 or kpritchett@ukb-nan.gov or TNPO Eric Cosahwee-Voss at (918) 458-6717 or coosahwee-voss@ukb-nsn.gov

U17-643 HKR# 17,0659

Thank you,

Karen Pritchett

THPO Assistant

Tribal Historic Preservation Office

United Keetoowah Band of Cherokee Indians in Oklahoma

P. D. Box 1245

Tahlequah, OK 74465

918-458-6715

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10



Asa Hutchinson Governor

> Stacy Hurst Director

Arkansas Arts Council

Arkansas Historic Preservation Program

Arkansas Natural Heritage Commission

Arkansas State Archives

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars Cultural Center

Old State House Museum



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April 10, 2017

Alison McCartney Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Dear Ms. McCartney:

This letter is to acknowledge that on April 7, 2017, I received your letters dated April 3, 2017 and April 4, 2017, regarding the following projects:

- 8100 (020) JMS EOI 1103
- 8100 (020) JMS Cleburne Co. EOI 728
- 8100 (020) JMS Cleburne Co. EOI 726
- 8100 (020) JMS Cleburne Co. EOI 730
- 8100 (020) JMS EOI 1080

The letters and attachments were immediately forwarded to the appropriate historic preservation managers to assist in your research.

Sincerely,

Stacy Hurst Director & State Historic Preservation Officer

SH:hc





Office of the Chief OFEGA

S. Joe Crittenion. Departy Principal Chief a. Kg. Jeyay Waa diga oesga

April 24, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Cleburne Co. EOI 726

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Cleburne Co. EOI 726, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office elizabeth-toombs@cherokee.org

igasthe Toombro

918.453.5389





TRIBAL HISTORIC PRESERVATION OFFICE

Date: May 26, 2017

File: 1617-2401AR-4

RE: DOI, BLM Eastern States, EOI 726, Cleburne County, Arkansas

BLM -- Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 726, Cleburne County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



SNO Response to BLM EOI726project

1 message

Theodore Isham <isham.t@sno-nsn.gcv> To: "Sullivan, John" <j35sullivan@blm.gov> Mon. Apr 24, 2017 at 11:44 AM

This *Opinion* is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oklahoma

Historic Preservation Officer

PO Box 1499

Wewoka, Ok. 74884

Phone: 405-234-5218

e-mail: isham.t@sno-nsn.gov



Asa Hutchinson Governor

> Stacy Hurst Director

Arkansas Arts Council

Arkansas Historic Preservation Program

Arkansas Natural Heritage Commission

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April 10, 2017

Alison McCartney Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Dear Ms. McCartney:

This letter is to acknowledge that on April 7, 2017, I received your letters dated April 3, 2017 and April 4, 2017, regarding the following projects:

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- 8100 (020) JMS Cleburne Co. EOI 730
- 8100 (020) JMS EOI 1080

The letters and attachments were immediately forwarded to the appropriate historic preservation managers to assist in your research.

Sincerely,

Stacy Hurst Director & State Historic Preservation Officer

SH:hc





Office of the Chief
Hill John Hater
Schoolsel Chief

BBI John Baker Principal Chief GP CL ユSSみかり O-ESGA

8. Joe Criticades. Departy Frontied Chief 20. KC: JEF-20F WPA DLCAL OFESCA

April 24, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Cleburne Co. EOI 728

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Cleburne Co. EOI 728, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

igasthe Toombro

elizabeth-toombs@cherokee.org

918.453.5389





TRIBAL HISTORIC PRESERVATION OFFICE

Date: May 26, 2017

File: 1617-2400AR-4

RE: DOI, BLM Eastern States, EOI 728, Cleburne County, Arkansas

BLM – Eastern States John Sutlivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 728. Cleburne County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist



SNO Response to BLM E01728 project

1 message

Theodore Isham <isham.t@sno-nsn.gov> To: "Sullivan, John" <j35sullivan@blm.gov> Mon, Apr 24, 2017 at 11:42 AM

This *Opinion* is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to aethority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminele Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminele Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Semmole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oklahoma

Historic Preservation Officer

PO Box 1498

Wewoka, Ok. 74884

Phone: 405-234-5218

e-mail: isham.t@sno-nsn.gov



Asa Hutchinson Governor

> Stacy Hurst Director

Arkansas Arts Council

Arkansas Historic Preservation Program

Arkansas Natural Heritage Commission

Arkansas State Archives

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars Cultural Center

Old State House Museum



1100 North Street Little Rock, AR 72201

(501) 324-9150 fax: (501) 324-9154 TDD: 711

e-mail: info@arkansasheritage.com website: www.arkansasheritage.com

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April 10, 2017

Alison McCartney Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Dear Ms. McCartney:

This letter is to acknowledge that on April 7, 2017, I received your letters dated April 3, 2017 and April 4, 2017, regarding the following projects:

- 8100 (020) JMS EOI 1103
- 8100 (020) JMS Cleburne Co. EOI 728
- 8100 (020) JMS Cleburne Co. EOI 726
- 8100 (020) JMS Cleburne Co. EOI 730
- 8100 (020) JMS EOI 1080

The letters and attachments were immediately forwarded to the appropriate historic preservation managers to assist in your research.

Sincerely,

Stacy Hurst Director & State Historic Preservation Officer

SH:hc





Office of the Chief

Hill John Haker Principal Chief OP CL 1588-807 O-ESGA

S. Joe Criticales. Deputy Frontial Chief D. KC. JEFDF WPA DLCM OFSCA

April 24, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Cleburne Co. EOI 730

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Cleburne Co. EOI 730, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

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elizabeth-toombs@cherokee.org

918.453.5389





TRIBAL HISTORIC PRESERVATION OFFICE

Date: May 26, 2017

File: 1617-2399AR-4

RE: DOI, BLM Eastern States, EOI 730, Cleburne County, Arkansas

BLM – Eastern States John Sullivan 273 Market Street Flowcod, Mississippi 39232

Dear Mr. Sullivan.

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 730, Clebume County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

527 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



SNO Response to BLM EOI730 project

1 message

Theodore Isham <isham,t@sno-nsn.gov> To: "Sullivan, John" <j35sullivan@bim.gov> Mon. Apr 24, 2017 at 11:43 AM

This *Opinion* is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oklahoma

Historic Preservation Officer

PO Box 1498

Wewoka, Ok 74884

Phone: 405-234-5218

e-mail: isham.t@sno-nsn.gov



Asa Hutchinson Governor

> Stacy Hurst Director

April 14, 2017

Ms. Alison McCartney
Acting Assistant District Manager
Natural Resources Program Specialist
United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Fiewood, Mississippi 39232

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Arkansas Arts Council.

Arkantas Nationi Hentage Commission

Arkingas Stare Archives

Delta Cultural Center

Historio Azkansas Muscoun

Mesaic Templars Coloral Center

Old State House Museum

RE: Van Buren County - General Section 196 Review - BLM Proposed Undertaking: EOJ 733-1

Proposed Undertaking: EOI 733-Lease of Federal Minerals under Privately Owned Surface, i.e. Split-estate Minerals

AHPP Tracking Number: 98004

Dear Ms. McCartney:

This letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program (AHPP) has reviewed records pertaining to the area in question.

There are no recorded cultural resources located within this undertaking. However, due to the scarcity of cultural resources surveys conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of direct impacts.



Tribes that have expressed an interest in the area include the Osage Nation (Dr. Andrea Hunter), the Quapaw Tribe of Oklahoma (Mr. Everett Handy), the Shawnee Tribe of Oklahoma (Ms. Kim Jumper), and the United Keetoowah Band of Cherokee Indians (Ms. Eric Oosahwee-Voss). We recommend that they be consulted in accordance with 26 CTR § 800.2 (c) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dudson of my staff at 501-324-9784.

1100 North Steet Little Rock, AR 72201

(501) 324-9880 Fax: (501) 324-9184 tad; 711

ekurit. ictor@arkarsaspreservation.org withsite: www.urkansaspreservation.com

Ar. Equal Opportunity Employer

Stacy Hurst Director and SHPO

cc: Dr. Ann Larly, Arkansas Archeological Survey Dr. Andrea Hanter, The Osage Nation

I'D:tr

Sincerely





Office of the Chief

Bill John Baker Erincipal Chief OP CL 1888-807 O-ERG A

8. In Criticales. Deputy Front and Chief 20. KC: JEF-20F WPA Die'41 O'ESCA

April 25, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Van Buren Co. EOI 733

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Van Buren Co. EOI 733, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

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elizabeth-toombs@cherokee.org

918.453.5389





TRIBAL HISTORIC PRESERVATION OFFICE

Date: May 26, 2017

File: 1617-2476AR-4

RE: DOI, BLM Eastern States, EOI 733, Van Buren County, Arkansas

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 733, Van Buren County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist



Asa Hutchenson Geografia

> Stacy Hurst Director

April 14, 2017

Ms. Alison McCartney
Acting Assistant District Manager
Natural Resources Program Specialist
United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232

Arkansus Arts Council

Arkense Natural Heritage Commission

Arkanses State Archives

Delta Cultural Center

Historia Arkansas Museum

Mosaic Templors Cultural Center

Old State House Museum

E: Van Buren County – General Section 106 Review – BLM

Proposed Undertaking EOI 737-Lease of Federal Minerals under Privately Owned Surface, i.e. Split-estate Minerals

AHPP Tracking Number: 98003

Dear Ms. McCartney:

This letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program (AHPP) has reviewed records pertaining to the area in question.

There are no recorded cultural resources located within this undertaking. However, due to the scarcity of cultural resources surveys conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of direct impacts.

Tribes that have expressed an interest in the area include the Osage Nation (Dr. Andrea Hunter), the Quapaw Tribe of Oklahoma (Mr. Everett Bandy), the Shawnee Tribe of Oklahoma (Ms. Kim Jumper), and the United Kectoowah Band of Cherokee Indians (Mr. Eric Oosahwee-Voss). We recommend that they be consulted in accordance with 36 CTR § 800.2 (e) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dudson of my staff at 501-324-9784.

ARKANSAS HISTORIO PRESERVATION PROCESAM

1100 North Spect Lipite Rock, AR 77201

(501) 324-9880 Fax: (501) 324-9184 t.id: 711

e neal; inflo@arkansaspreservation.org wahsite: www.arkansaspreservation.com

An Esphal Opportunity Euroloyer

Stacy Hurst

Sincenely

Director and SHPO

ec: Dr. Ann Early, Arkansas Archeological Survey Dr. Andrea Hunter, The Osage Nation

The Conge trace

TD:tr





Date: May 26, 2017

File: 1617-2474AR-4

RE: DOI, BLM Eastern States, EOI 737, Van Buren County, Arkansas

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 737, Van Buren County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Kodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



Asii Hutelaiison Governor

> Stacy Hurst Objector

April 18, 2017

Ms. Alison McCartney
Acting Assistant District Manager
Natural Resources Program Specialist
United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232



Arkansas Arts Council

Arkansas Natural Haritaga Commission

Arkanszs State Archives

Delta Coltural Center

Historia Arkansas Museum

Mosaie Tempiaes Cultural Center

Old State Bouse Moseum

RE: Van Buren County - General Section 106 Review - BLM Proposed Undertaking: EOI 738-Lease of Federal Minerals under Privately Owned Surface, i.e. Split-estate Minerals AHPP Tracking Number: 98044

Dear Ms. McCartney:

This letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program (AHPP) has reviewed records pertaining to the area in question.

There are no recorded cultural resources located within this undertaking. However, due to the scarcity of cultural resources surveys conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of direct impacts.

Tribes that have expressed an interest in the area include the Osage Nation (Dr. Andrea Hunter), the Quapaw Tribe of Oklahoma (Mr. Everett Bandy), the Shawnee Tribe of Oklahoma (Ms. Kim Jumper), and the United Keetstowah Band of Cherokee Indians (Mr. Bric Oosahwee-Voss). We recoramend that they be consulted in accordance with 36 CFR § 800.2 (c) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dodson of my staff at 501-324-9784.

ARKANSAS HISTORIC PRESERVATION PROCESSI



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e-mail: mto@arkansaspreservation.e.g website: www.arkansaspreservation.com

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Stacy Hurst Director and SHPO

Sinegrely,

Dr. Ann Early, Arkansas Archeological Survey

Dr. Andrea Hunter, The Osage Nation

TD:h





Office of the Chief

OFEGA

S. Joe Crittenion. Departy Principal Chief a. Kg. Jeyay Waa diga oesga

April 25, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Van Buren Co. EOI 738

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Van Buren Co. EOI 738, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

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elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-2439AR-4

RE: DOI, BLM Eastern States, EOI 738, Van Buren County, Arkansas

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 738, Van Buren County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Kodgers Archaeologist



Asa Hutchinson Governor

> Stacy Hurst Director

Arkansas Arts Coancil

Arkansis Nammi Heritage Commission

Arkansas State Archives

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars Cultural Center

Old State House Museum





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April 18, 2017

Ms. Alison McCartney
Acting Assistant District Manager
Natural Resources Program Specialist
United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232



RE: Van Buren County – General Section 106 Review – BLM

Proposed Undertaking: EOI 739-Lease of Federal Minerals under Privately

Owned Surface, i.e. Split-estate Minerals

AHPP Tracking Number: 98045

Dear Ms. McCartney:

This letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program (AHPP) has reviewed records pertaining to the area in question.

There are no recorded cultural resources located within this undertaking. However, due to the scarcity of cultural resources surveys conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of direct impacts.

Tribes that have expressed an interest in the area include the Osage Nation (Dr. Andrea Hunter), the Quapaw Tribe of Oklahoma (Mr. Everett Bandy), the Shawnee Tribe of Oklahoma (Ms. Kim Jumper), and the United Keetoowah Band of Cherokee Indians (Mr. Eric Oosahwee-Voss). We recommend that they be consulted in accordance with 36 CFR § 800.2 (c) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dodson of my staff at 501-324-9784.

Stady Hurst Director and SHPO

Sincerely

Dr. Ann Early, Arkansas Archeological Survey Dr. Andrea Hunter, The Osage Nation

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TD:tr





Office of the Chief

Bill John Bater Principal Chief OP CL JSS&&& O-ERG A

8. Joe Criticados. Depay Françai Chief 20. KG. JEFAF WPA DLCA OESCA

April 25, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Van Buren Co. EOI 739

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Van Buren Co. EOI 739, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

igasth Joons

elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-2440AR-4

RE: DOI, BLM Eastern States, EOI 739, Van Buren County, Arkansas

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 739, Van Buren County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



Asa Hutchinson Gaverner

> Stacy Hurst Director

Atkansas Aris Council

Arkanses National Heatage Commission

Arkansas State Archives

Delta Cactural Center

Historic Arkansas Museum

Mosaie Templary Cultural Center

Old State House Museum





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April 18, 2017

Ms. Alison McCarrney
Acting Assistant District Manager
Natural Resources Program Specialist
United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Flowgood, Mississippt 39232

E: Van Buren County – General Section 106 Review – BLM Proposed Undertaking: EOI 743-Lease of Federal Minerals under Privately Owned Surface, i.e. Split-estate Minerals AHPP Tracking Number: 98042

Dear Ms. McCarrney:

Tais letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program (AHPP) has reviewed records pertaining to the area in question.

There are no recorded cultural resources located within this undertaking. However, due to the scarcity of cultural resources surveys conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of direct impacts.

Tribes that have expressed an interest in the area include the Osage Nation (Dr. Andrea Hunter), the Quapaw Tribe of Oklahoma (Mr. Everett Bandy), the Shawnee Tribe of Oklahoma (Ms. Kim Tumper), and the United Keetoowah Band of Cherokee Indians (Mr. Bric Oosahwee-Voss). We recommend that they be consulted in accordance with 36 CFR § 800.2 (c) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AIPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dodson of my statf at 501-324-9784.

Stacy (lurst) Director and SHPO

Sincerely

Dr. Ann Early, Arkansas Archeological Survey

Dr. Andrea Hunter, The Osage Nation

TD:r

cc:





Office of the Chief

Bill John Baker Principal Chief BP CL JSS66-607 O-EBG A

8. Joe Criticades. Departy Frontied Chief 20. KC: JEF-20F WPA DLCAL OFESCA

April 25, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Van Buren Co. EOI 743

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Van Buren Co. EOI 743, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

igasthe Toombro

elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-2475AR-4

RE:

DOI, BLM Eastern States, EOI 743, Van Buren County, Arkansas

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 743, Van Buren County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Kodgers Archaeologist EOI 961
5th Principal Meridian
White County (Steprock and Judsonia Quadrangles)
T. 9 N., R. 7 W., Sec. 26, W1/2SE West of River (Total acres 39.57)
Created on 02/15/12
Placed in NEPA folder 11/22/13

Affected Environment

Native American Religious Concerns

Federally recognized Native American tribes and groups have been contacted about this proposed undertaking. Known sites of Native American religious activities have not been located. The area has not been surveyed for cultural resources. Religious sites or sites of cultural importance to Native Americans may be present.

Cultural Resources

The proposed lease area has not been surveyed and there are no recorded sites within on mile of the leasing area, the area may have sites that would qualify as historic properties (36 CFR 61). A professionally conducted survey for historic properties would add information on human utilization of this area.

Impacts

Proposed Action Alternative - Direct and Indirect Impacts

Native American Religious Concerns

If no cultural resource surveys are conducted, direct and indirect impacts may occur when ground disturbing activities begin. Direct impacts are those such as completely destroying a site by bulldozing the area and workers picking up artifacts. Indirect impacts are those such as erosion or compaction of the soil on the site. However, if sites are located and recorded before ground disturbance begins, these impacts can be avoided or mitigated.

Cultural Resources

If no cultural resource surveys are conducted, direct and indirect impacts may occur when ground disturbing activities begin. Direct impacts are those such as completely destroying a site by bulldozing the area and workers picking up artifacts. Indirect impacts are those such as erosion or compaction of the soil on the site. However, if sites are located and recorded before ground disturbance begins, these impacts can be avoided or mitigated.



Asa Hutchleson Governor

> Stacy Hurst Director

Arkansas Arts Council

Arkansas Historic Preservation Program

Arkareas Natural Heritage Commission

Arkansas State Archives

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars Cultural Center

Old State House Museum



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April 12, 2017

Alison McCartney Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Dear Ms. McCartney:

This letter is to acknowledge that on April 10, 2017, I received your letters dated April 5, 2017, regarding the following projects:

- 8100 (020) JMS Cleburne Co. EOI 1469
- 8100 (020) JMS Cleburne Co. EOI 1086
- 8100 (020) JMS Cleburne Co. FOI 1148

The letters and attachments were immediately forwarded to the appropriate historic preservation managers to assist in your research.

Sincerely,

Stacy Hurst

Director & State Historic Preservation Officer

SH:hc





Office of the Chief

OFEGA

S. Joe Crittenion. Departy Principal Chief a. Kg. Jeyay Waa diga oesga

April 24, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Cleburne CO EOI 1086

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Cleburne CO EOI 1086, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

igasthe Toombro

elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-2367AR-4

RE: BLM, 8100 (020) JMS EOI 1086, Lease federal minerals, Cleburne County, AR

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed BLM, 8100 (020) IMS EOI 1086, Lease federal minerals, Cleburne County, AR. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



SNO Response to BLM E0I1086 project

1 message

Theodore Isham <isham.t@sno-nsn.gov> To: "Sullivan, John" <j35sullivan@blm.gov> Mon. Apr 24, 2017 at 11:46 AM

This *Opinion* is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, madvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Semanole Nation of Okiahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oktahoma

Historic Preservation Officer

PO Box 1498

Wewoka, Ok. 74884

Phone: 405-234-5218

o-mail: isham.t@sno-nan.gov



Asa Hutchinson Governor

> Stacy Hurst Director

Arkansas Arts Council

Arkansas Historic Preservation Program

Arkansas Natural Heritage Commission

Arkansas State Archives

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars Cultural Center

Old State House Museum



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April 10, 2017

Alison McCartney Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Dear Ms. McCartney:

This letter is to acknowledge that on April 7, 2017, I received your letters dated April 3, 2017 and April 4, 2017, regarding the following projects:

- 8100 (020) JMS EOI 1103
- 8100 (020) JMS Cleburne Co. EOI 728
- 8100 (020) JMS Cleburne Co. EOI 726
- 8100 (020) JMS Cleburne Co. EOI 730
- 8100 (020) JMS EOI 1080

The letters and attachments were immediately forwarded to the appropriate historic preservation managers to assist in your research.

Sincerely,

Stacy Hurst Director & State Historic Preservation Officer

SH:hc



RE: EOI 1103 Stone Co Arkansas

1 message

Erin Thompson <ethompson@astribe.com>
To: "Sullivan, John" <j35sullivan@blm.gov>

Wed, Apr 26, 2017 at 8:19 AM

To Whom It May Concern:

The Absentee Shawnee Tribe offers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Shawnee cultural or historic site to the project site. As such, we defer comment to your office as well as to the State Historic Preservation Office and/or State Archaeologist. However, as the site is within the aboriginal homelands of the Absentee Shawnee Tribe, if any human remains for Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or other archaeological evidence of Native Americans is discovered during any phase of this project, the Absentee Shawnee Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery.

Erin Thompson

Tribal Historic Preservation Officer

Absentee Shawnee Tribe of Oklahoma

2025 Gordon Cooper Drive

Shawnee, OK 74801

(P) 405.275.4030 Ext. 6340

ethompson@astribe.com

From: Sullivan, John [mailto:j35sullivan@blm.gov]

Sent: Monday, April 03, 2017 3:58 PM

To: Erin Thompson

Subject: EOI 1103 Stone Co Arkansas

If you have any questions please let me know.

Thanks

ims

John M. Sullivan, RPA





Office of the Chief OFEGA

S. Joe Crittenion. Departy Principal Chief a. Kg. Jeyay Waa diga oesga

April 24, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS EOI 1103

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS EOI 1103, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

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elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-2372AR-4

RE:

DOI, BLM, EOI 1103 Split-Estate Minerals, Stone County, Arkansas

BLM Eastern States John Sullivan 273 Market Street Flowcod, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received northeation and accompanying information for the proposed DOI, BLM, EOI 1103 Split Estate Minerals, Stone County, Arkansas, There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely.

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



Sullivan, John <j35sullivan@blm.gov>

FW: EOI 1103 Stone Co Arkansas, 8100 (020) JMS EOI 1103

karen pritchett <kpritchett@ukb-nsn.gov>

Wed, Apr 26, 2017 at 4:46 PM

To: "[35sullivan@BLM.Gov" <[35sullivan@btm.gov>
Co: "Tirn.dodson@arkansas.gov" <Tirn.dodson@arkansas.gov>, Eric Oosahwee-Voss <eccsahwee-voss@ukb-nsn.gov>, karen pritchett <kpritchett@ukb-nsn.gov>

Dear John,

On behalf of Tribal Historic Preservation Officer (THPO) Eric Oosahwee-Voss, please accept this digital communication regarding Bureau of Land Management (BLM) Expression of Interest (EOI) 630, to lease federal minerals under privately owned surface, i.e. split-estate minerals in Stone County, Arkansas. 8100 (020) JMS EOI 1103

Please be advised that the proposed undertaking lies within the traditional territory of the United Keetoowah Band of Cherokee Indians in Oklahoma (UKB). This opinion is being provided by UKB THPO, pursuant to authority vested by the UKB Corporate Board and under resolution 16-UKB-34. The United Keetoowah Band is a Federally Recognized Indian Nation headquartered in Tahlequah, OK.

We agree that a cultural resources survey is warranted prior to ground disturbing activities. Please forward a copy of the report, when complete, for our review.

Thank you for consulting with the UKB. Please note that these comments are based on information available to us at the time of the project review. We reserve the right to revise our comments as information becomes available. If you have any questions or concerns, please contact me at (918) 458-6715 or kpritchett@ukb-nsn.gov or THPO Eric Oosahwee-Voss at (918) 458-6717 or eoosahwee-voss@ukb-nsn.gov

U17-655

UKB#

17.0671

Thank you,

Karen Pritchett

THPO Assistant

Tribal Historic Preservation Office

United Keelcowsh Band of Cherokee Indians in Oklahoma

P. O. Box 1245

Tahlequah, OK 74465

918-458-6715

https://mail.google.com/mail/u/0/?ui=2&ik=b15d4efae6&view=pt&msg=15bac3d06718f643&search=inbox&simi=15bac3d06718f643

1/2



Asa Hutchleson Governor

> Stacy Hurst Director

Arkansas Arts Council

Arkansas Historic Preservation Program

Arkareas Natural Heritage Commission

Arkansas State Archives

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars Cultural Center

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April 12, 2017

Alison McCartney Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Dear Ms. McCartney:

This letter is to acknowledge that on April 10, 2017, I received your letters dated April 5, 2017, regarding the following projects:

- 8100 (020) JMS Cleburne Co. EOI 1469
- 8100 (020) JMS Cleburne Co. EOI 1086
- 8100 (020) JMS Cleburne Co. EOI 1148

The letters and attachments were immediately forwarded to the appropriate historic preservation managers to assist in your research.

Sincerely,

Stacy Hurst

Director & State Historic Preservation Officer

SH:hc





Office of the Chief

Bill John Baker Erincipal Chief OP CL USS&&& O-ESGA

S. Joe Criticales. Deputy Frontial Chief D. KC. JEFDF WPA DLCM OFSCA

April 24, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Cleburne Co. EOI 1148

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Cleburne Co. EOI 1148, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

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elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-2368AR-4

RE:

BLM, 8100 (020) EOI 1148, Lease split-estate minerals, Cleburne County, AR

BI.M – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed BLM, \$100 (020) EOI 1148, Lease split-estate minerals, Cleburne County, AR. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



SNO Response to BLM EOI1148 project

1 message

Theodore Isham <isham.t@sno-nsn.gov> To: "Sullivan, John" <j35suliivan@blm.gov> Mon. Apr 24, 2017 at 11:47 AM

This *Opinion* is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Semmole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminale Nation of Oklahoma

Historic Preservation Officer

PO Box 1498

Wewoka, Ok. 74584

Phone: 405-234-5218

e-mail: isham.t@sno-nsn.gov



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Arkansas Arts Council

Arkansas Natural Heritage Commission

Arkausas State Archives

Delta Cultural Center

Historie Arkansas Museum

Mosaic Templars Cultural Center

Old State House Museum





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7501) 324 9880 fex: (501) 324-9164 fekt 711

e-mail: Indogarkansaspreservarion.org website: www.arkansaspreservation.com

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April 18, 2017

Ms. Alison McCartney
Acting Assistant District Manager
Natural Resources Program Specialist
United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232



5: Van Buren County – General Section 106 Review – BLM Proposed Undertaking: EOI 1174-Lease of Federal Minerals under Privately Owned Surface, i.e. Split-estate Minerals AHPP Tracking Number: 98043

Dear Ms. McCartney:

This letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program (AHPP) has reviewed records pertaining to the area in question.

There are no recorded cultural resources located within this undertaking. However, due to the scarcity of cultural resources surveys conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of direct impacts.

Tribes that have expressed an interest in the area include the Osage Nation (Dr. Andrea Hunter), the Quapaw Tribe of Oklahoma (Mr. Everett Bandy), the Shawnee Tribe of Oklahoma (Ms. Kim Jumper), and the United Kectoowah Band of Cherokee Indians (Mr. Eric Oosahwee-Voss). We recommend that they be consulted in accordance with 36 CFR § 800.2 (c) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dodson of my staff at 501-324-9784.

Sinceryly.

Stack Hurst Director and SHPO

co: Dr. Ann Early, Arkansas Archeological Survey

Dr. Andrea Hunter, The Osage Nation

TD:tr





Office of the Chief
Bill John Bater
Principal Chief

Hill John Haker Principal Chief BP CL (1888-807 O-ERG A

8. Joe Criticales. Depay Frontial Chief 20. KC, dEF-20F WPA DIe'44, OESCA

April 25, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood. MS 39232

Re: 8100 (020) JMS Van Buren Co. EOI 1174

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Van Buren Co. EOI 1174, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

igasthe Toombro

elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-2477AR-4

RE: DOI, BLM Eastern States, EOI 1174, Van Buren County, Arkansas

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM Eastern States, EOI 1174, Van Buren County, Arkansas. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



Asa Hutchleson Governor

> Stacy Hurst Director

Arkansas Arts Council

Arkansas Historic Preservation Program

Arkansas Natural Heritage Commission

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April 12, 2017

Alison McCartney Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Dear Ms. McCartney:

This letter is to acknowledge that on April 10, 2017, I received your letters dated April 5, 2017, regarding the following projects:

- 8100 (020) JMS Cleburne Co. EOI 1469
- 8100 (020) JMS Cleburne Co. EOI 1086
- 8100 (020) JMS Cleburne Co. FOI 1148

The letters and attachments were immediately forwarded to the appropriate historic preservation managers to assist in your research.

Sincerely,

Stacy Hurst

Director & State Historic Preservation Officer

SH:hc



RE: EOI 1469

1 message

Erin Thompson <ethompson@astribe.com> To: "Sullivan, John" <j35sullivan@blm.gov> Tue, Apr 25, 2017 at 3:35 PM

To Whom It May Concern:

The Absentee Shawnee Tribe offers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Shawnee cultural or historic site to the project site. As such, we defer comment to your office as well as to the State Historic Preservation Office and/or State Archaeologist. However, as the site is within the aboriginal homelands of the Absentee Shawnee Tribe, if any human remains for Native American cultural items failing under the Native American Graves Protection and Repatriation Act (NAGPRA) or other archaeological evidence of Native Americans is discovered during any phase of this project, the Absentee Shawnee Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery.

Respectfully,

Erin Thompson

Tribal Historic Preservation Officer

Absentee Shawnee Tribe of Oklahoma

2025 Gordon Cooper Drive

Shawnee, OK 74801

(P) 405.275.4030 Ext. 6340

ethompson@astribe.com

From: Sullivan, John [mailto:j35sullivan@blm.gov]

Sent: Wednesday, April 05, 2017 1:43 PM

To: Erin Thompson

Subject: EOI's 1086, 1148 and 1469

If you have any questions please let me know.

Thanks

jms





Office of the Chief OFEGA

S. Joe Crittenion. Departy Principal Chief a. Kg. Jeyay Waa diga oesga

April 24, 2017

John M. Sullivan Archaeologist/Tribal Liaison US Department of the Interior Bureau of Land Management Southeastern States District Office 273 Market Street Flowood, MS 39232

Re: 8100 (020) JMS Cleburne Co. EOI 1469

Mr. Sullivan:

The Cherokee Nation (CN) is in receipt of your correspondence about 8100 (020) JMS Cleburne Co. EOI 1469, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project and cross referenced the project's legal description against our information and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that the Bureau of Land Management (BLM) halt all project activities immediately and re-contact our Offices for further consultation.

Additionally, we would request BLM conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records. If you require additional information or have any questions, please contact me at your convenience.

Thank you for your time and attention to this matter.

Wado.

Elizabeth Toombs, Special Projects Officer Cherokee Nation Tribal Historic Preservation Office

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elizabeth-toombs@cherokee.org





Date: May 26, 2017

File: 1617-237 AR-4

RE:

BLM 8100 (020) EOI 1469, Lease split-estate minerals, Cleburne County, AR

BLM – Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed BLM 8100 (020) EOI 1469, Lease split-estate minerals, Cleburne County, AR. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



SNO Response to BLM EOI1469 project

1 message

Theodore Isham <isham.t@sno-nsn.gov> To: "j35sutlivan@blm.gov" <j35sutlivan@blm.gov> Mon, Apr 24, 2017 at 11:41 AM

This *Opinion* is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oklahoma

Historic Preservation Officer

PO Box 1498

Wewoka, Ok 74884

Phone: 405-234-5218

e-mail: isham.t@sno-nsn.gov



United States Department of the Interior

Bureau of Land Management

Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232
http://www.cs.blm.gov

IN REPLY REFER TO: 8100 (020) JMS EOI 1770



March 09, 2017

Ms. Stacy-Hurst A. H. P. B.
State Historic Preservation Officer

1500 Tower Building Attn: Saction 1-06

323 Center Street 11 og North St.

Little Rock, Arkansas 72201

AHPP

MAR 16 2017

Dear Ms. Hurst:

The Bureau of Land Management (BLM) has received an Expression of Interest (EOI) 1770, to lease federal minerals under privately owned surface, i.e. split-estate minerals. The Bureau's Reasonably Foresecable Development scenario (RFD) for this proposed lease is 4 wells from two pads. EOI 1770 will have a net disturbance of 13.9 acres. The disturbance includes; access road, gathering line and reserve pit to access these federal minerals.

The legal locations of the approximately 80 acres of federal mineral tracts are as follows (map enclosed):

MAR 2 9 26

Fifth Principal Meridian
Cleburne County (Parma Quadrangle)
T. 12 N., R. 11 W., Sec. 4, SESW
T. 12 N., R. 11 W., Sec. 23, SESE, (Approx. 80 ac.)

A review of the Arkansas Heritage Preservation Program site files shows no sites or surveys within one mile of the proposed lease sale. Development locations have not been determined on a site-specific basis. Specific locations proposed for development are determined by the developer and surface owners. The BLM's surface responsibilities rest only within the boundaries of any proposed development.

A section of the lease document will state that before the BLM approves any development proposal, a survey that meets current professional standards and a report that meets the Arkansas Heritage Preservation Program requirements may be required. A report of survey results must be approved



WILD HORSES & STUBBOS + CADASTRAL SURVEY + GRAEKAL LAND OFFICE RECORDS + MINERALS + RESEWANCE RESOCUED





RE: EOI 1770 Cleburne Co Ar

Erin Thompson <ethompson@astribe.com> To: "Sullivan, John" <j35sullivan@blm.gov> Fri, Mar 17, 2017 at 10:23 AM

To Whom It May Concern:

The Absentee Shawnee Tribe offers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Shawnee cultural or historic site to the project site. As such, we defer comment to your office as well as to the State Historic Preservation Office and/or State Archaeologist. However, as the site is within the aboriginal hometands of the Absentee Shawnee Tribe, if any human remains for Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or other archaeological evidence of Native Americans is discovered during any phase of this project, the Absentee Shawnee Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery.

Respectfulty,

Erin Thompson

Tribal Historic Preservation Officer

Absentee Shawnee Tribe of Oklahoma

2025 Gordon Cooper Drive

Shawnee, OK 74801

(P) 405.275.4030 Ext. 6340

ethompson@astribe.com

From: Sullivan, John [mailto:j35sullivan@blm.gov]

Sent: Friday, March 10, 2017 2:46 PM

To: Erin Thompson

Subject: EOI's 1770 and 1773 Cleburne Co Ar

If you have any questions please let me know.

Thanks

jms





Office of the Chief

Bill John Baker Principal Chief 9P Ch. 155&&&F 0-18GA

S. Joe Criticades Deputy Principal Chief & KG, MEY&Y WPA DLa'A OESGA

March 29, 2017

Bruce Dawson, District Manager Southeastern States district Office US DOI/ Bureau of Land Management 273 Market St. Flowood, MS 39232

Re: EOI 1773 Project

Bruce Dawson:

The Cherokee Nation (CN) is in receipt of your correspondence re the EOI 1770 Project and appreciates the opportunity to provide comment upon this project. The Cherokee Nation maintains databases/records of cultural/historic/pre-historic resources in this area. Our Historic Preservation Office has reviewed this project and cross referenced the project's legal description against our information and has found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that all project activities be immediately halted and you re-contact our Offices for further consultation. Additionally, we would request your Organization conduct appropriate inquiries with other Historic Preservation Offices regarding historic/prehistoric resources not included in the CN databases/records. If you require additional information or have any questions, please contact me at your convenience:

- 918/453-5704
- pat-gwin@cherokee.org

Thank you for your time and attention to this matter.

Sincerely,

Pat Gwin

Administration Liaison Cherokee Nation



RE: EOI's 1770 and 1773 Cleburne Co Ar

Robin Dushane < RDushane@estou.net> To: "Sulfivan, John" < j35sullivan@blm.gov> Wed, Mer 15, 2017 at 2:41 PM

Dear Mr. Sullivan,

In accordance with Section 106 of the National Historic Preservation Act of 1956, as amended (16 U.S.C. 470f), and Implementing regulation, 36 CFR 900, "Protection of Historic Properties" the Eastern Shawnee Tribal Historic Preservation Office is responding to your request for identifying properties of significance to our Triba within Clabume County, AR,

Currently this office is unaware of properties of significance to inform you of that would be involved in the area of Clebume County, AR identified in your letter sent below.

Sincerely.

Rollin Dushane

Tribal Historic Preservation Officer

Eastern Shawnee Tribe

70500 E 128 Rd.

Wyandotte, OX 74370

918 533 4104-cell

rdushane@estoo.net

From: Sullivan, John [malto:j35sullivan@blm.gov]
Sent: Friday, March 10, 2017 2:45 PM
To: Robin Dushane <RDushane@estoo.net>
Subject: EOI's 1770 and 1773 Cleburne Co Ar

If you have any questions please let me know.

Thanka

Jms



TRIBAL HISTORIC PRESERVATION OFFICE

Date: April 26, 2017

File: 1617-2174AR-3

RE: DOI, BLM, EOI 1770, Lease federal minerals in Celhurne County, AR

BLM – Fostern States John Sullivan 273 Market Street Flowcod, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed project DOI, BLM, EOI 1770, Lease Tederal minerals in Celburne County, AR. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



RE: EOI's 1770 and 1773 Cleburne Co Ar

1 message

Theodore Isham <isham.t@sno-nsn.gov> To: "Sullivan, John" <j35sullivan@blm.gov> Mon, Apr 3, 2017 at 9:04 AM

This **Opinion** is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oklahoma

Historic Preservation Officer

PO Box 1498

Seminole, Ok 74868

Phone: 405-234-5218

e-mail: isham.t@sno-nsn.gov

From: Sullivan, John [mailto:j35sullivan@blm.gov]

Sent: Friday, March 10, 2017 2:45 PM

To: Theodore Isham <isham.t@sno-nsn.gov> Subject: EOI's 1770 and 1773 Cleburne Co Ar

If you have any questions please let me know.

Thanks

jms



8100 (020) JMS EOI 1770

1 message

Tonya Tipton <tonya@shawnee-tribe.com> To: j35sullivan@blm.gov

Thu, Mar 23, 2017 at 10:09 AM

This letter is in response to the above referenced project.

The Shawner Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project.

We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume consultation under such a circumstance.

Thank you for giving us the opportunity to comment on this project.

Sincerely,

Tonya Tipton Shawnee Tribe



United States Department of the Interior

Bureau of Land Management

Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232

http://www.cs.blm.gov

IN REPLY REFER TO: 8100 (020) JMS EOI 1773

67677

March 09, 2017

Mr. Stacy Hurst A Thomas Historic Proportion Program
State Historic Preservation Office Alma Scarte Line
Leading All Control of Cont

1500 Tower Building 14 90 Mary St.

Little Rock, Arkansas 72201

AHPP

MAR 1 6 2017

Dear Ms. Husst:

The Bureau of Land Management (BLM) has received an Expression of Interest (EOI) 1773, to lease federal minerals under privately owned surface, i.e. split-estate minerals. The Bureau's Reasonably Foresceable Development scenario (RFD) for this proposed lease is 2 wells from one pad. EOI 1773 will have a net disturbance of 6.3 acres. The disturbance includes; access road, eathering line and reserve pit to access these federal minerals.

The legal locations of the approximately 80 acres of federal mineral tracts are as follows (man enclosed):

Fifth Principal Meridian
Cleburne County (Parma and Greers Ferry Quadrangles)
F. 11 N., R. 12 W., See, J., W1/2NWNE (Approx. 20 ac.)

No known historic properties will be affected by this undertaking. This effect determination could change should have information to be to light.

France McSwoln, DeputyStatie
Historic Preservation Officer

A review of the Arkansas Heritage Preservation Program site files shows no sites or surveys within one mile of the proposed lease sale. Development locations have not been determined on a site-specific basis. Specific locations proposed for development are determined by the developer and surface owners. The BLM's surface responsibilities rest only within the boundaries of any proposed development.

A section of the lease document will state that before the BLM approves any development proposal, a survey that meets current professional standards and a report that meets the Arkansas Heritage Preservation Program requirements may be required. A report of survey results must be approved by both the Arkansas Heritage Preservation Program and the BLM before any ground disturbing



WILD HORSES & BARROS - CADASTICAL SURVEY - CENTRAL LAND OFFICE RECORDS - MINIFICALS - RESPONDED FRESOCIES



MAR 2 0 2017



RE: EOI 1773 Cleburne Co Ar

Erin Thompson <athompson@astribe.com> To: "Sulliven, John" <j35sUliven@blm.gov>

Fri. Mar 17, 2017 at 10:19 AM

To Whom It May Concern:

The Absentee Shawnee Tribe effers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Shawnee cultural or historic site to the project site. As such, we defor comment to your office as well as to the State Historic Preservation Office and/or State Archaeologist. However, as the site is within the aboriginal homelands of the Absentee Shawnee Tribe, if any numan remains for Native American cultural items falling under the Native American Graves Protection and Repathation Act (NAGPRA) or other archaeological evidence of Native Americans is discovered during any phase of this project, the Absentee Shawnee Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery.

Respectfully,

Erin Thompson

Tribal Historic Preservation Officer

Absentee Shawnee Tribe of Oklahoma

2025 Gordon Cooper Drive

Shawnee, OK 74801

{P} 405.275,4030 Ext. 6340

ethompson@astribe.com

From: Sullivan, John [mailto:j35sullivan@blm.gov]

Sent: Friday, March 10, 2017 2:46 PM

To: Erin Thompson

Subject: EOI's 1770 and 1773 Cleburne Co Ar

If you have any questions please let me know.

Thanks

TIS





Office of the Chief

Bill John Baker Principal Chief 92 Ch. 155&&&F 0-18GA

S. Joe Criticades Deputy Principal Chief 50. KG: MEY50Y WPA DLc'A O-ERGA

March 29, 2017

Bruce Dawson, District Manager Southeastern States district Office US DOI/ Bureau of Land Management 273 Market St. Flowood, MS 39232

Re: EOI 1773 Project

Bruce Dawson:

The Cherokee Nation (CN) is in receipt of your correspondence re the EOI 1773 Project and appreciates the opportunity to provide comment upon this project. The Cherokee Nation maintains databases/records of cultural/historic/pre-historic resources in this area. Our Historic Preservation Office has reviewed this project and cross referenced the project's legal description against our information and has found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time. However, if during the conduct of this project, items of cultural significance are discovered, the CN requests that all project activities be immediately halted and you re-contact our Offices for further consultation. Additionally, we would request your Organization conduct appropriate inquiries with other Historic Preservation Offices regarding historic/prehistoric resources not included in the CN databases/records. If you require additional information or have any questions, please contact me at your convenience:

- 918/453-5704
- pat-gwin@cherokee.org

Thank you for your time and attention to this matter.

Sincerely,

Pat Gwin

Administration Liaison Cherokee Nation



RE: EOI's 1770 and 1773 Cleburne Co Ar

Robin Dushane < RDushane@estou.net> To: "Sulfivan, John" < j35sullivan@blm.gov> Wed, Mer 15, 2017 at 2:41 PM

Dear Mr. Sullivan,

In accordance with Section 106 of the National Historic Preservation Act of 1986, as amended (16 U.S.C. 470f), and Implementing regulation, 36 CFR 800, "Protection of Historic Properties" the Eastern Shawnee Tribal Historic Preservation Office is responding to your request for identifying properties of significance to our Triba within Clabume County, AR,

Currently this office is unaware of properties of significance to inform you of that would be involved in the area of Clebume County, AR identified in your letter sent below.

Sincerely.

Rollin Dushane

Tribal Historic Preservation Officer

Eastern Shawnee Tribe

70500 E 128 Rd.

Wyandotte, OX 74370

918 533 4104-cell

rdushane@estoo.net

From: Sullivan, John [malto:j35sullivan@blm.gov]
Sent: Friday, March 10, 2017 2:45 PM
To: Robin Dushane <RDushane@estoo.net>
Subject: EOI's 1770 and 1773 Cleburne Co Ar

If you have any questions please let me know.

Thanka

Jms





TRIBAL HISTORIC PRESERVATION OFFICE

Date: April 26, 2017

File: 1617-2175AR-3

RE: DOI, BLM, 8100 (020) JMS EOI 1773, Lease federal minerals in Celburne County, AR

BLM - Eastern States John Sullivan 273 Market Street Flowood, Mississippi 39232

Dear Mr. Sullivan,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed DOI, BLM, 8100 (020) JMS EOI 1773, Lease federal minerals in Celburne County, AR. There are no known Osage resources within the project area. This office looks forward to reviewing the final report.

Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Sincerely,

Jackie Rodgers Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



RE: EOI's 1770 and 1773 Cleburne Co Ar

1 message

Theodore Isham <isham.t@sno-nsn.gov> To: "Sullivan, John" <j35sullivan@blm.gov> Mon, Apr 3, 2017 at 9:04 AM

This **Opinion** is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location. The Seminole Nation of Oklahoma has no comment on the project as proposed.

We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.

Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma and other appropriate agencies be immediately notified.

Theodore Isham

Seminole Nation of Oklahoma

Historic Preservation Officer

PO Box 1498

Seminole, Ok 74868

Phone: 405-234-5218

e-mail: isham.t@sno-nsn.gov

From: Sullivan, John [mailto:j35sullivan@blm.gov]

Sent: Friday, March 10, 2017 2:45 PM

To: Theodore Isham <isham.t@sno-nsn.gov> Subject: EOI's 1770 and 1773 Cleburne Co Ar

If you have any questions please let me know.

Thanks

jms



United States Department of the Interior

FISH AND WILDLIFE SERVICE

110 S. Amity Road, Suite 300 Conway, Arkanses 72032 Tel.; 501/513-4470 Fax; 501/513-4480



October 13, 2017

Jason Ross U.S. Bureau of Land Management Southeastern States Field Office Jackson, Mississippi

Dear Mr. Ross,

The U.S. Fish and Wildlife Service (Service) has reviewed the information supplied in your letter, dated August 17, 2017, regarding the proposed seventeen oil and gas lease in Cleburne County (BOI #726, BOI #728, BOI #730, BOI #1086, BOI #1148, BOI #1469, BOI #1770, BOI #1773), Stone County (BOI #1103), Van Buren County (BOI #630, BOI #733, BOI #737, BOI #738, BOI #739, BOI #734, BOI #1174), and White County (BOI #961b). Our comments are submitted in accordance with the Endangered Species Act (BSA; 87 Stat. 884, as amended 16 U.S.C. 1531 et seq.), Migratory Bird Treaty Act (16 U.S.C. 703-712), and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d).

The Service concurs with your determination for Cleburne. Stone, Van Buren, and White Counties that the proposed project may affect, but is not likely to adversely affect the Indiana Bat (Myotls sodalis), Gray Bat (Myotls grisescens), Northern Long-eared Bat (Myotls septentrionalis), Speckled Pocketbook (Lampsilis struckeri), Rabbitsfoot (Quadrula cylindrica cylindrica), and Yellowcheek Darter (Etheostoma moorei). The Service concurs with your determination that the proposed project will have no effect on Pink Mucket (Lampsilis abrupta). Cave Crayfish (Cambarus suphanastes), Snuffbox (Epioblasma triquetra), Fat Pocketbook (Potamilus capax), Piping Plover (Charadrius meladus), and Scaleshell (Leptodea leptodon).

Please be aware Bald Eagle is not protected under the ESA. Bald Eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). Refer to the Service's website at www.fws.gov/southeast/our-services/permits/eagles/#national-rules-and-regulations for management guidelines and conservation measures.

We appreciate your interest in the conservation of endangered species. If you have any questions, please contact the Arkansas Ecological Services Staff at (501) 513-4487.

Sincerely,

Melvin Tobin Project Leader

APPENDIX C: REASONABLY FORSEEABLE DEVELOPMENT

Case File Number: EOI 630

Project Number: DOI-BLM-ES-0020-2009-0027-EA

Acres: 107.5

Location: AR, Van Buren County, 5th Principal Meridian, T10N, R14W, SEC.34, NE/4 SW/4

ADN E/2 SW/4 AND SW/4 SE/4 and pt of the NW/4 SE/4 -

CA#ARES 56193, DL#ARES 56191

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective Horizon is Fayetteville Shale. Mineral commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Estimate 3 wells drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 0.34 acres (500'X30')

Well Pad & Pit: 4.9 acres (500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 5.24 acres

Partial Reclamation of Drill Site: 0.34 acres (150'X100')

Net Disturbance for Productive Wells: 4.9 acres

Case File Number: EOI 726

Project Number: N/A

Acres: 453

Location: AR, Cleburne County, 5th Principal Meridian, T12N, R8W, Sec.2, Frac.NW; Sec.8, NENE, NWSE; Sec.9, E2NE, NESE; Sec.10, NWSW; Sec.15, NWNW; Sec. 17, NWNW, NENW, SENW;

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 17 wells drilled from 7 pads.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 3.44 acres (5000'X30')

Well Pad & Pit: 34.15 acres (7X500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 37.59 acres

Partial Reclamation of Drill Site: 2.38 acres

Net Disturbance for Productive Well: 35.21 acres

Case File Number: EOI 728

Project Number: DOI-BLM-ES-0020-2010-0027-EA

Acres: 325

Location: AR, Cleburne County, Fifth Principal Meridian, T12N, R10W, Sec. 9, N2NW SESW,

N2N2 SWSW, NWSW, Sec. 15, NWSW, SESW, SWSE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective Horizon is the Fayetteville Shale. Mineral commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 8 wells drilled from 4 pads.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 3.44 acres (5000'X30')

Well Pad & Pit: 19.6 acres (4X500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 23.01 acres

Partial Reclamation of Drill Sites: 1.36 acres (4X150'X100')

Net Disturbance for Productive Wells: 21.65 acres

Case File Number: EOI 730

Project Number: DOI-BLM-ES-0020-2010-0025-EA

Acres: 40

Location: AR, Cleburne County, Fifth Principal, T12N, R12W, Sec. 23, NESE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective Horizon is the Fayetteville Shale. Mineral commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 1 well drilled from 1 multi-well pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 1.7 acres (2500'X30')

Well Pad & Pit: 4.9 acres (500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 6.6 acres

Partial Reclamation of Drill Site: 0.34 acres (150'X100')

Net Disturbance for Productive Well: 6.26 acres

Case File Number: EOI 733

Project Number: DOI-BLM-ES-0020-2012-0038-EA

Acres: 65

Location: AR, Van Buren County, Fifth Prinicpal Meridian, T9N, R12W, Sec. 21, Metes and

Bounds (see map for description)

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project multiple laterals drilled from 1 pad,

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: .52 acres (750' X 30')

Well Pad & Pit: 5.74 acres (500' X 500')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 6.26 acres

Partial Reclamation of Drill Site: .34 acres

Net Disturbance for Productive Well: 5.92 acres

Case File Number: EOI 737

Project Number: DOI-BLM-ES-0020-2010-0088-EA

Acres: 10.63

Location: AR, Van Buren County, Fifth Principal Meridian, T11N, R12W, Sec. 33, Part of the

SWNW

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 1 well drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 0.34 acres (500'X30')

Well Pad & Pit: 4.9 acres (500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 5.24 acres

Partial Reclamation of Drill Site: 0.34 acres

Net Disturbance for Productive Well: 4.9 acres

Case File Number: EOI 738

Project Number: DOI-BLM-ES-0020-2010-0026-EA

Acres: 766.15

Location: AR, Van Buren County, Fifth Principal Meridian, T11N, R14W, Sec. 1, SWNW, Sec. 2, NENW, Sec. 4, W2SE, Sec. 6, S2N2, NWNE, N2NW, W2SW, Sec. 18, W2NW, NESW, Sec. 31, E2NW, SWNE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective Horizon is the Fayetteville Shale. Mineral commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 12 wells drilled from 7 multi-well pads.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 6.68 acres (9700'X30')

Well Pad & Pit: 34.3 acres (7X500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 40.98 acres

Partial Reclamation of Drill Site: 4.08 acres (12X150'X100')

Net Disturbance for Productive Well: 36.9 acres

Case File Number: EOI 739

Project Number: DOI-BLM-ES-0020-2010-0028-EA

Acres: 507.5

Location: AR, Van Buren County, Fifth Principal, NENE, E2SE, Sec. 13, NENE, Sec. 20, SENW, S2SWNW, S2NWSWNW, NWNWSWNW, Sec. 23, SWSE, Sec. 24, NWNE, Sec. 26, S2NW, Sec. 29, SESW, S2SE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective Horizon is the Fayetteville Shale. Mineral commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 11 wells drilled from 8 multi-well pads.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 8.06 acres (11700'X30')

Well Pad & Pit: 39.2 acres (8X500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 47.26 acres

Partial Reclamation of Drill Sites: 3.74 acres (11X0.34)

Net Disturbance for Productive Wells: 43.52 acres

Case File Number: EOI 743

Project Number: DOI-BLM-ES-0020-2010-0109-EA

Acres: 120

Location: AR, Van Buren County, Fifth Principal T12N, R15W, Sec. 15, W2NE, Sec. 26,

NWNW

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 4 wells drilled from 2 pads.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 0.90 acres (1300'X30')

Well Pad & Pit: 9.8 acres (2X500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 10.7 acres

Partial Reclamation of Drill Site: 0.68 acres

Net Disturbance for Productive Well: 10.02 acres

Case File Number: EOI 961B

Project Number: DOI-BLM-ES-0020-2012-0014-EA

Acres: 11.90

Location: AR, White County, 5th Principal Meridian, T9N, R7W, Sec. 26, W2SE, 11.9 acres in

the riverbed of the Little Red River

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project multiple laterals drilled from 1 pad. There are existing pads for previously drilled wells. Disturbance estimate for one new pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

Well will be fracked with 8 Million gallons of water and 15 Million pounds of sand. Each well will take 3 weeks to drill and complete.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: .52 acres (750' X 30')

Well Pad & Pit: 5.74 acres (500' X 500')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 6.26 acres

Partial Reclamation of Drill Site: .34 acres

Case File Number: EOI 1086

Project Number: DOI-BLM-ES-0020-2011-0008-EA

Acres: 80

Location: AR, Cleburne County, Fifth Principal Meridian, T9N, R11W, Sec. 6, N2NE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 3 wells drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 1.58 acres (2300'X30')

Well Pad & Pit: 4.9 acres (500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 6.48 acres

Partial Reclamation of Drill Site: 0.34

Net Disturbance for Productive Well: 6.14 acres

Case File Number: EOI 1103

Project Number: DOI-BLM-ES-0020-2011-0011-EA

Acres: 80

Location: AR, Stone County, 5th Principal Meridian. T13N, R12W, Sec. 36, S2SE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is Natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 3 wells drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 0.14 acres (200'X30')

Well Pad & Pit: 4.88 acres (500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 5.02 acres

Partial Reclamation of Drill Site: 0.34 acres

Net Disturbance for Productive Well: 4.68 acres

Case File Number: EOI 1148

Project Number: Unknown

Acres: 40

Location: AR, Cleburne County, 5th Principal Meridian, T12N, R11W, Sec. 36, SESE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective Horizon is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 2 wells drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 1.24 acres (1800'X30')

Well Pad & Pit: 4.88 acres (500'X425')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 6.12 acres

Partial Reclamation of Drill Site: 0.34 acres

Net Disturbance for Productive Well: 5.78 acres

Case File Number: EOI 1174

Project Number: Unknown

Acres: 20

Location: AR, Van Buren County, 5th Principal Meridian, T12N, R14W, Sec. 20, W2E2SE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 1 well drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 0.55 acres (800'X30')

Well Pad & Pit: 4.88 acres

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 5.43 acres

Partial Reclamation of Drill Site: 0.34 acres

Net Disturbance for Productive Well: 5.09 acres

Case File Number: EOI 1469

Project Number:

Acres: 40

Location: AR, Cleburne County, 5th PM, T12N, R11W, Sec 24, SWSW

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres. Project 2 wells drilled from 1 pad.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 2.07 acres (3000'X30')

Well Pad & Pit: 5.74 acres (500'X500')

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 7.81 acres

Partial Reclamation of Drill Site: .5 acres

Net Disturbance for Productive Well: 7.76 acres

Case File Number: EOI 1770

Project Number:

Acres: 80

Location: 5th Principal Meridian, Arkansas, Cleburne County, T12N, R11W, Sec. 4, SESW and

Sec. 23, SESE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas. Project 4 wells to be drilled from 2 well pads. Well pads may already be present and also used for the drilling of other wells.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded. All disturbed acreage will be reclaimed if the well is non-productive.

Each well will take two weeks to drill and complete.

Each well will be stimulated using high volume hydrofracking. Approximately 10,000,000 gallons of water and 5,000,000 pounds of sand will be used in each well.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 1.72 acres (2500'X30")

Well Pad & Pits: 12.05 acres (2 X 500'X 525")

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 13.77 acres

Partial Reclamation of Drill Site: 0.68 acres

Net Disturbance for Productive Well: 13.09 acres

Case File Number: EOI 1773

Project Number:

Acres: 20

Location: 5th Principal Meridian, Arkansas, Cleburne County, T11N, R12W, Sec. 1, W2NWNE

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Fayetteville Shale. Commodity is natural gas. Project 2 wells to be drilled from 1 well pad. Well pad may already be present and also used for the drilling of other wells.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 640 acres.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded. All disturbed acreage will be reclaimed if the well is non-productive.

Each well will take two weeks to drill and complete.

Each well will be stimulated using high volume hydrofracking. Approximately 10,000,000 gallons of water and 5,000,000 pounds of sand will be used in each well.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 0.34 acres (500'X 30")

Well Pad & Pits: 6.03 acres (2 X 500' X 525")

Utility and/or Pipeline R.O.W: 0 – Use access road ROW

Initial Disturbance: 6.37 acres

Partial Reclamation of Drill Site: 0.34 acres

Net Disturbance for Productive Well: 6.03 acres